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BRITISH MEDICAL JOURNAL

LONDON SATURDAY APRIL 23 1955

CROSS-INFECTION OF WOUNDS WITH ANTIBIOTIC-RESISTANT ORGANISMS*

BY

E. J. L. LOWBURY, B.M., B.Ch.

(From M.R.C. Industrial Injuries and Burns Unit, Birmingham Accident Hospital)

The dilemma of hospital infection has been complicated rather than solved by chemotherapy. An appraisal of the problem in terms not only of the disease but of the micro-organism (cf. Okell and Elliott, 1936; Wright, 1940) gave promise of a better insight into and control over the transfer of infection. But the bacteriological index is in some respects much more sensitive than the clinical, and its application has revealed surprising weaknesses in the customary routine for control of cross-infection. A special problem to-day is the frustration of chemotherapy by the spread of resistant organisms among the staff and the patients—a possibility forecast by Miles (1944), when he pointed out the errors of excusing perfunctory asepsis on the grounds that the sulphonamides and penicillin were available. This lesson has, however, been fully demonstrated only during the past few years with the arrival of more antibiotics.

It is in surgery that the new dilemma is particularly evident, because the organisms which cause infection of wounds include some that are outstanding in their ability to acquire resistance to chemotherapeutic agents, and some that are insensitive, or relatively insensitive, to all the agents made available so far. I shall consider separately the two basic problems, prevention of the emergence of resistant bacteria and prevention of the transfer of bacteria—especially of resistant strains—from the environment to the patient. In both of these departments, moreover, it is necessary to consider each chemotherapeutic agent and each bacterial species as a separate problem; indeed, within each species fundamental differences of behaviour may be found, and generalizations about cross-infection or acquired resistance referring to all species are almost sure to be wrong.

Prevention of the Emergence of Resistant Bacteria

Briefly, two mechanisms, selection and adaptation, are generally postulated to account for the phenomena of acquired resistance. Selection of resistant organisms may occur in the presence of an antibiotic, either when these are normally present together with sensitive ones—for example, as a very small proportion of the total—or when they emerge independently as mutants from sensitive parent cells. In either case the resistant organism arises independently of the antibiotic, which merely selects it from a mixed flora (Demerec, 1945, 1948). The other mechanism presupposes modification of the bacterial metabolism caused by contact with the chemotherapeutic agent, an adaptive change for which evidence has been presented by Hinshelwood (1952), Barber (1953), and others. An additional mechanism may be the transfer of resistance from resistant to sensitive organisms in a mixed culture (see Hotchkiss, 1951). It is probable that resistance may be acquired both by selection and by adaptation, and any controversy on this question is pointless except when it refers to the action of a particular agent on a particular organism.

Special Features of the Commoner Chemotherapeutic Agents

Streptomycin is exceptional among antibiotics in that any (or almost any) bacteria can be rendered resistant to it after relatively short contact *in vitro* or *in vivo* (Florey *et al.*, 1949). Penicillin is also exceptional in that resistance is often due to production of a penicillin inactivator (penicillinase), a property of the organism which may be enhanced by culture in the presence of the antibiotic (e.g., Segalove, 1947). The other antibiotics are not destroyed by organisms resistant to them.

It is of interest that the ease with which an organism may be rendered resistant by subculturing it through media containing an antibiotic is no index of the likelihood that resistant bacteria will emerge during treatment with the antibiotic. For example, it is easy to render staphylococci highly resistant to penicillin *in vitro*, but such resistant strains do not produce penicillinase (cf. Abraham *et al.*, 1941; Bondi and Dietz, 1944). These would seem, therefore, to be different in origin from the penicillin-resistant staphylococci isolated from wounds and from the nares of patients in hospital, which are almost uniformly penicillinase producers (Barber, 1953). We have found it easy, by *in vitro* methods, to produce strains of *Staphylococcus aureus* resistant to neomycin, but such strains have not appeared on burns during a controlled trial of neomycin.

Special Features of the Commoner Wound Bacteria

Streptococcus pyogenes, the most feared of the commoner aerobic organisms, has shown less tendency to acquire resistance to the antibiotics than some of the other pathogens. The successful control of streptococcal infections in recent years must in great measure be attributed to this property. Strains of *Str. pyogenes* resistant to penicillin have not yet been recognized. Resistance to sulphonamides, however, does occur, and strains resistant to the tetracyclines ("aureomycin" and "terramycin") have occasionally been found—for example, on burns (Lowbury and Cason, 1954). Other

*Based on a paper read to the Medical Society of the Birmingham Accident Hospital on December 20, 1954.

streptococci and pneumococci do not share this exceptional vulnerability, and the ubiquitous *Staph. aureus* has, in complete contrast, an exceptional capacity for acquiring resistance to antibiotics and other agents. Phage-typing shows that this property is associated principally with certain phage types and patterns of the species, classified as group III (Williams *et al.*, 1953), which appear to be less stable in their genetic structure than the others (Barber and Whitehead, 1949; Barbour and Edwards, 1953; Lowbury and Hood, 1953), and which have largely replaced the less adaptable members of the species in hospitals, where the use of antibiotics has favoured their survival at the expense of the others.

Among the Gram-negative bacilli, *Ps. pyocyanea* has shown an almost uniform sensitivity to polymyxin, and, surprisingly, no tendency to acquire resistance to this antibiotic either *in vitro* or *in vivo* (Jackson *et al.*, 1951a). This contrasts with its frequent resistance to streptomycin (Seligmann and Wassermann, 1947), and, in smaller measure, to neomycin (Goldin, 1953). Members of the genus *Proteus*, by contrast, are resistant to polymyxin, and not sufficiently or uniformly sensitive to any of the agents at present available (e.g., Poole, 1954). The problem of *acquired* resistance is therefore relevant only in therapy of individual infections with this organism, not in prophylaxis.

Origin of Reservoirs of Resistant Strains in Hospital

There can be little doubt that cross-infection is the important factor which determines the accumulation of resistant staphylococci in hospitals. This is particularly evident in the case of antibiotics against which the organisms do not readily acquire resistance—for example, chlortetracycline. We used chlortetracycline for several weeks in the treatment of burned patients before resistant staphylococci began to appear in the burns of some of them; not long after this, however, the majority of staphylococci isolated from burns were found to be resistant to chlortetracycline, and most of these were isolated from patients who were not receiving the antibiotic. In treatment with streptomycin, resistance is so likely to be induced in wound bacteria that control of cross-infection is not the crucial factor in determining its continued value as an antibiotic—though cross-infection with such organisms is undoubtedly very common.

The importance of cross-infection in producing reservoirs of resistant bacteria receives further support from our experience with *Str. pyogenes*. In contrast with *Staph. aureus*, cross-infection with this organism can for various reasons be substantially limited, and, although chlortetracycline-resistant streptococci have emerged on several occasions in the burns of patients treated with the antibiotic, no reservoir of such organisms has been built up in the Burns Unit.

Methods of Preventing Emergence of Resistant Bacteria

Three procedures may help to prevent, or at least delay, the emergence of resistant bacteria: (1) economy in the use of chemotherapeutic agents; this implies not only restricting their use for cases in which they are specially indicated, but also giving them in sufficient amount to achieve a complete effect in the shortest possible time—an approach to the *therapia sterilisans magna* of Ehrlich; (2) avoidance of agents which readily induce resistance—especially streptomycin—when other agents will do as well; and (3) the use of two or more agents together. This third method has been vindicated in the treatment of tuberculosis by combinations of streptomycin, *para*-aminosalicylic acid, and isoniazid (M.R.C., 1949, 1953). If the resistant organisms emerge by selection of mutants, the use of two unrelated antibiotics will provide a barrier against the emergence of any mutants except those in which resistance to both antibiotics has been acquired at the same time, and the proportion of all divisions which give rise to such double mutation is likely to be exceedingly small. Moreover, two unrelated antibiotics used together will interfere with different metabolic processes and so reduce the chances that the organism will establish an alternative metabolism to the one which has been blocked (Garrod, 1953). If two agents fail to prevent the emergence of resistant strains, three or even four agents may still have this effect (cf. Carpenter *et al.*, 1945).

In addition to its effect in preventing the emergence of resistant bacteria, combined therapy may be associated with synergistic action—enhancement of the bactericidal effects of one agent by combination with other agents (Ungar, 1943; Garrod, 1953). The converse effect—antagonism—may also be found with some combinations (see Jawetz, 1952).

Efforts to Prevent Emergence of Resistant Staphylococci in a Burns Unit

This is essentially a study of *Staph. aureus*, since the other species which have been studied are either resistant to chemotherapy or not liable to become resistant to the chosen antibiotics. Recently in trials of chemoprophylaxis against *Staph. aureus* in burns we have obtained results which give some grounds for hope; but before describing them I must recall some of the earlier hopes which were not fulfilled during studies on burns in the past 12 years.

From the Glasgow burns unit, Colebrook and his colleagues (Clark *et al.*, 1943) reported successful chemotherapy for *Staph. aureus* in burns by local application of a penicillin cream. Five years later this effect was not maintained (Colebrook, Duncan, and Ross, 1948), and when shortly after this we made a controlled prophylactic trial of penicillin cream on burns it showed no prophylaxis whatever against staphylococci, though there was a highly significant effect against *Strep. pyogenes* (Jackson *et al.*, 1951b). During this trial about 70% of the staphylococci isolated from burns were resistant to penicillin. A short trial of dibromopropamidine—brought to an end because of local toxic action (Cruickshank *et al.*, 1955)—was accompanied by an increased resistance of staphylococci in the burns to this compound.

Next we made a trial of chlortetracycline, which had recently been introduced and which was apparently active against all the staphylococci from burns in our unit. An assessment of this trial after a few weeks showed a significant prophylactic effect against *Staph. aureus*; but from about the sixth week we began to detect chlortetracycline-resistant staphylococci, which became predominant in the ward soon afterwards. With this emergence of resistance we found that chlortetracycline was no longer protecting burns against *Staph. aureus* (Lowbury, Topley, and Hood, 1952). Staphylococcal phage was then tried, and after showing promise of prophylactic value it selected a breed of phage-resistant staphylococci in the burns (Lowbury and Hood, 1953). Finally, erythromycin, which we were investigating as an antibiotic for streptococcal infections, left us a legacy of resistant staphylococci—after eight months in which no resistant strains appeared (Lowbury and Cason, 1954).

Before embarking on trials of combined prophylaxis we thought it worth while testing the prophylactic value of certain compounds suitable for topical rather than for systemic administration, including neomycin and a synthetic compound, 1:6-di-4′-chlorophenyl-diguanidohexane (I.C.I. 10,040, or "hibitane") (Davies *et al.*, 1954). Our purpose was to use each of these agents for a short time, and switch from one to another after three months, or as soon as resistant strains began to appear; these, it was argued from previous experience, should soon be diluted out of the resident flora when there is nothing to favour them rather than other staphylococci. Moreover, we were anxious to know whether these agents had any value when used alone.

And then, since sensitive strains—for example, of *Str. pyogenes*—not infrequently appear on burns in spite of the presence of penicillin, it seemed to us that combined therapy may perhaps be relatively ineffective in preventing acquired resistance during prophylaxis of burn infection. Finally, we had reasons, from initial laboratory tests, to believe that staphylococci might be rendered resistant to neomycin and to hibitane less readily than to the other chemotherapeutic agents which we had studied.

Preliminary trials—first of neomycin for three months, and then of hibitane for four months—were carried out as follows.

Eligible patients were those who (*a*) had burns of less than 20% body area, (*b*) were not given skin grafts on admission, and (*c*) were regarded as suitable for treatment by the closed method. These patients were allocated by random selection to groups which received local applications either of penicillin cream (controls) or of penicillin cream plus (in the first trial) neomycin (2 mg./g.) or (in the second trial) hibitane (1 mg./g. of the dihydrochloride) on admission and at all dressings till healing, discharge, or operation. Burns were sampled with moistened swabs on admission and at every dressing or operation. The swabs were inoculated on a variety of media and investigated by methods described elsewhere (see Jackson *et al.*, 1951a, 1951b). The results of the trial of neomycin are shown in Table I.

TABLE I.—*Neomycin Prophylaxis for Staphylococcus Aureus on Burns (During First 14 Days)*

Cream Applied at Dressings Containing	Staphylococcus		Total	% Acquired
	Acquired	Not Acquired		
Neomycin ..	5	28	33	15
No neomycin ..	18	12	30	60
Total ..	23	40	63	

$\chi^2 = 11{\cdot}59$. $P < 0{\cdot}001$.

TABLE II.—*Hibitane Prophylaxis for Staphylococcus Aureus on Burns (During First 14 Days)*

Cream Applied at Dressings Containing	Staphylococcus		Total	% Acquired
	Acquired	Not Acquired		
Hibitane	6	23	29	21
No hibitane ..	28	5	33	85
Total ..	34	28	62	

$\chi^2 = 23{\cdot}11$. $P < 0{\cdot}001$.

Whereas 18 out of 30 (60%) burns treated with the control penicillin cream picked up *Staph. aureus* during the first 14 days after admission, only 5 out of 33 (15%) of the burns treated locally with neomycin and penicillin picked up the organism in that period. Table II summarizes the results of the trial of hibitane. Of 33 burns treated with penicillin cream, 28 (85%) picked up *Staph. aureus* during the first 14 days after admission; by contrast, only 6 (21%) of the 29 burns treated with hibitane cream picked up the organism.

None of the staphylococci isolated from burns during this time has been resistant to either agent. This fact is consistent with our failure to induce resistance of staphylococci to hibitane *in vitro*. Neomycin-resistant organisms, which can be obtained by *in vitro* methods, are small colony forms, and we have found that they show a diminished virulence for mice by the intramuscular test (Selbie and Simon, 1952). In this respect they are different from staphylococci in burns resistant to penicillin, chlortetracycline, chloramphenicol, and erythromycin. It is possible that the neomycin-resistant strains are also less well adapted for survival in the mixed flora of wounds and burns, as the non-penicillinase-producing penicillin-resistant staphylococci appear to be (Barber, 1953).

This study of prophylaxis must not, of course, be held to apply also to therapy of established infection. Separate trials are needed to determine the possible therapeutic value of local applications of neomycin and hibitane. Moreover, three or four months of prophylactic trial is too short a time to justify any confidence that resistant strains may not turn up later.

PREVENTION OF THE TRANSFER OF RESISTANT ORGANISMS

Staph. aureus is the conspicuous organism in this study not only because of its exceptional powers of emerging resistant but also because it occurs normally and abundantly in the nose and on the skin of so many healthy people. The second front of our attack—on the prevention of spread—is therefore again, to a great extent, a problem of *Staph. aureus*.

Barber (1947) and Barber and Rozwadowska-Dowzenko (1948) drew attention to the large and increasing proportion of staphylococci isolated from hospital patients and staff which were resistant to penicillin. These strains were apparently being selected as the result of treating patients with the antibiotic, but their prompt appearance in the nares of nurses and in many patients who had not received the antibiotic showed that cross-infection with resistant strains must be occurring on a large scale. Similar observations in respect of penicillin and of other antibiotics were made by many workers (for example, Rountree and Thomson, 1949; Forbes, 1949; Clarke *et al.*, 1952; Lowbury, Topley, and Hood, 1952), and it is now common knowledge that the classical methods for controlling cross-infection—barrier nursing, cubicle isolation, aseptic techniques—are quite inadequate for the exclusion of resistant staphylococci from susceptible sites of hospital patients.

For the limited objective of preventing cross-infection with resistant, as distinct from sensitive, organisms there is one recommendation—to stop using the antibiotic in question. Resistant strains will then no longer be favoured, and sensitive strains should have an equal opportunity of growing. During a prophylactic trial of chlortetracycline we found that the proportion of resistant staphylococci in the ward tended to fall after use of the antibiotic was discontinued at about the same rate as it increased while the antibiotic was in use, though a residue of resistant organisms persisted in the burns of patients who remained in hospital for many weeks. The dilemma is acute, as we are scarcely justified in withholding an effective antibiotic from a case of severe infection merely in order to preserve its effectiveness, unless equally good alternatives are available. The discovery of new antibiotics is therefore of the highest importance, and there is no pointless redundancy in having half-a-dozen alternative agents for the chemotherapy of *Staph. aureus*, provided that they differ from each other in their mechanism of action and therefore in the pattern of resistance which develops against them.

Prevention of Cross-infection as a General Problem in Surgery

Lister's achievements were apparently so complete that the unsolved problems of cross-infection in surgery were overlooked for some time afterwards, both by surgeons and by bacteriologists. The natural defences of healthy tissues are capable of accounting for many contaminants, and this undoubtedly exaggerated the apparent victory of asepsis. The surgical experience of two world wars and the development of the newer fields of operative surgery, however, revealed that a considerable amount of contamination passed through the aseptic barriers, and gave rise to clinical infection of varying severity (Stokes and Tytler, 1918; Fleming and Porteous, 1919; Miles *et al.*, 1940). But the failure of asepsis was still wider than the clinical data could show, for many wounds in which clinical signs of infection were absent could be found to heal more slowly when certain organisms were present than when they were kept free from those contaminants (Gissane *et al.*, 1944; Clayton-Cooper and Williams, 1945; Jackson *et al.*, 1951b). Such

"silent" infection was demonstrated by controlled study of methods which protected a random selection of the wounds at risk against contamination.

It is well known that transmission of bacteria from the environment to the patient may be through the air (by droplets, droplet-nuclei, or dust) or by contact (immediate or intermediate), but the factors which determine the relative importance of each route are complex and still imperfectly understood. Important factors are the viability of the organism outside the body—for example, Gram-positive cocci in general survive the evaporation of their suspending menstrua better than Gram-negative bacilli (Heller, 1941; Lowbury and Fox, 1953); the presence or absence of organisms in carriers among staff and patients—staphylococci, for instance, are commoner on the hands than streptococci, and therefore more apt to be transmitted by contact; the exposure or protection of the site of entry of organisms—for example, a wound of the hands or feet can be protected against contamination by dressings more easily than one of the trunk or face (Lowbury and Fox, 1954; Lowbury, Crockett, and Jackson, 1954).

Specific recommendations for the elimination of reservoirs of infection, for blocking the routes of transfer, and for increasing the resistance of the patient have been built up piecemeal with our increased knowledge of these mechanisms. After the early development of antisepsis and asepsis in operating theatres, of cubicle isolation, and of barrier nursing, there followed attempts to reduce air contamination by dust-laying with oils (Van den Ende *et al.*, 1940, 1941a, 1941b), by dispersion of chemical disinfectants such as hypochlorites, triethylene glycol, and lactic acid (Douglas *et al.*, 1928; Masterman, 1938; Robertson, 1946; M.R.C., 1948), by ultra-violet irradiation of air or surfaces (Hart, 1936; Hollaender *et al.*, 1944; M.R.C., 1948), and by air-conditioning with filtered air (Bourdillon and Colebrook, 1946).

Some of these methods contributed less than laboratory experiments had led one to expect, particularly ultra-violet irradiation—for example, M.R.C., 1954—and chemical disinfection (for example, Lidwell and Williams, 1954). In these examples the relative failure may have been caused, in part, by the impossibility of sterilizing dust by either of these methods at levels which are safe for the persons exposed (cf. Lidwell and Lowbury, 1950). Even dust-laying and air-conditioning, however—methods which do not depend on the killing of bacteria—achieve only a partial effect, not only because they too are imperfect but because they attack only one of the vectors of cross-infection. The relative importance of this vector probably varies greatly in different kinds of ward and with different organisms; this may explain the conflicting reports on protection against cross-infection by oiling of floors and bedclothes (Wright *et al.*, 1944; Clarke *et al.*, 1954).

The newer methods of combating contact infection involve the extension of aseptic methods beyond the operating theatre to the dressing of wounds in casualty dressing-rooms and wards. The value of no-touch technique was demonstrated in the dressing of neurosurgical wounds (McKissock *et al.*, 1941), and has been further validated in studies on added infection rates of a wider range of wounds in hospital (Williams *et al.*, 1945) and in factory surgeries (Clayton-Cooper and Williams, 1945). Involving no antibiotic barrier, such prophylaxis is equally effective against sensitive and resistant contaminants.

Colebrook's machinery for excluding bacteria from burns also involved the extension of aseptic principles—in this case to a field which Lister had ignored and in which asepsis had been thought unattainable. So, indeed, it remained in all but the smallest burns, if by asepsis was meant the total exclusion of bacteria. But the exclusion of some pathogens from some of the lesions—a lessening of the risks of sepsis—is an end worth attaining. It is the end that was achieved in trials of the no-touch dressing technique. For burns, Colebrook introduced more complex machinery of physical and chemical barriers against contamination by contact and from the air—the use of no-touch technique in an air-conditioned dressing-station with filters, together with local application of penicillin cream under ample dressings (Colebrook, Duncan, and Ross, 1948; Colebrook, 1950). The one organism which responded to this combined prophylaxis—*Str. pyogenes*—happened to be the most formidable pathogen commonly found on burns. It was also the one which was uniformly sensitive to penicillin. A trial of local penicillin (Jackson *et al.*, 1951a) confirmed the prophylactic effect of penicillin against *Str. pyogenes* and the absence of any effect on the other common flora—for example, *Staph. aureus*, which was predominantly resistant to penicillin at this time, and the coliform bacilli, *Ps. pyocyanea* and *Proteus*, which were uniformly resistant. This aroused a suspicion that the benefits which Colebrook reported after the combined attack on cross-infection with penicillin and dressings under filtered air might be attributable entirely to penicillin.

We found an answer to this question in a controlled trial of the air-conditioned dressing-station in the Burns Unit here (Lowbury, 1954). A significantly smaller proportion of burns dressed in the ventilated room acquired *Ps. pyocyanea*, *Proteus*, and antibiotic-resistant staphylococci than were acquired by the burns treated in the room with the ventilators switched off. *Str. pyogenes* was uncommon in burns during the trial, and the chances for its transfer were small, because burns carrying the organism were dressed at the end of each dressing list. Coliform bacilli appeared on approximately the same number of burns in the two groups—an indication that these organisms were probably acquired by self-contamination. A further point of interest in this trial was the significantly higher proportion of *Staph. aureus* resistant to chlortetracycline and penicillin and showing the "hospital strain" phage patterns (group III) which we found in the nares of patients dressed in the room with the air-conditioning plant switched off. This index of added infection is of special interest, as the patients spent only a small fraction of their total hospital time in the dressing-station.

The benefits of air-conditioning with filters, like those of the no-touch technique and other physical methods, cannot be lost through the emergence of resistant mutants.

Relative Importance of Wards, Dressing-stations, and Operating Theatres as Sites of Cross-infection

The trial which I have just described showed that the frequency of cross-infection could be reduced by changing the dressings, not in the ward but in a special room ventilated by filtered air under positive pressure. In spite of the elimination of this ward risk, however, the opportunities for transfer of infection to patients while they are in the ward must be great. Blankets, sheets, clothing, handkerchiefs, and other fabrics are known to be potential sources of cross-infection (Hare, 1941; Duguid and Wallace, 1948; Dumbell *et al.*, 1948), but soiled dressings must be regarded as a more important reservoir, from which both airborne and contact spread are liable to occur—the latter particularly if the dressings become soaked through with infected exudate. At the receiving end, burns or wounds which are imperfectly covered, and those with dressings that have become soaked with sterile exudate (Colebrook and Hood, 1948), present a good target for contaminants. Exposed burns, before their exudate has dried, are liable to pick up the airborne bacteria, and do in fact show *Str. pyogenes*, *Ps. pyocyanea*, *Staph. aureus*, and other bacteria more often than perfectly covered burns of feet and hands (Lowbury, Crockett, and Jackson, 1954).

Evidence that much of the cross-infection occurs in the ward if dressings are done in a separate room has come to light in recent studies on one organism, *Ps. pyocyanea* (Lowbury and Fox, 1954). For a period of seven months all the *Ps. pyocyanea* from burns in this unit were typed by an agglutination method (Christie, 1948; Fox and Lowbury, 1953). It was possible to divide the strains into three major groups, each consisting of a large number of apparently variable subgroups or patterns. The patients

from whom the strains were isolated were in two wards, E and F, but had their dressings and operations in the same dressing-station and operating theatre. Nevertheless, each ward had for a time its own predominant strain, which was serologically different from the predominant strain of the other ward.

How much added infection occurs in operating theatres? For many years the efficiency of our aseptic drill has been taken for granted, though individual flaws have from time to time been exposed. For example, Devenish and Miles (1939) found that a proportion of rubber gloves used in the operating theatre had minute holes through which skin staphylococci and other organisms could pass into the wounds. Cleansing fluids—for example, 1% cetrimide, 10% "dettol," soap solution—were commonly found to be contaminated with *Ps. pyocyanea* when dispensed in bottles with corks—the organism apparently being protected by the cork (Lowbury, 1951). Reports of tetanus (Sevitt, 1949) and of gas gangrene (Sevitt, 1953) apparently acquired in an operating theatre focused attention on the unsatisfactory air hygiene of the standard operating theatre, which is ventilated by extractor fans over the sterilizers; by this method air is sucked into the theatre through doors, windows, and other apertures, carrying with it a representative selection of hospital and street flora. The need for a new style of operating theatre ventilated with filtered air under positive pressure was demonstrated by Cairns (1939), and, more recently, by Girdlestone and Bourdillon (1951), and is now being recognized more widely. Such a theatre should be planned to incorporate other features which are likely to reduce the chances of contamination—for example, designed to minimize movements and personnel in the zone of operation (Gissane *et al.*, 1944). The frequency of wound contamination and infection at operations carried out in theatres of the old and new types is the subject of an extended investigation by Dr. Sevitt and myself in this hospital, to be reported later.

DISCUSSION AND CONCLUSION

Each of the measures found to have some effect in preventing the emergence or the transfer of antibiotic-resistant organisms makes, by itself, only a fractional contribution. Added together they contribute rather more, but still do not nearly solve the problem, which demands an extension and improvement of existing methods and the search for new ones. Elimination of the primary reservoirs of infection (places where pathogens breed) and of the targets for infection are obviously of the first importance. Sometimes—for example, in the primary excision and grafting of burns—both objects may be achieved by the same procedure. Some idea of the difficulty of setting up effective barriers is given by Rogers (1951), who found that cross-infection with infantile gastro-enteritis and the transfer of specific serological types of *Bact. coli* was not prevented by strict cubicle isolation. In open hospital wards, Anderson *et al.* (1954) have shown that the standard of nursing has little influence on the rate of cross-infection with these organisms. Sauer (1935), however, reported success in preventing cross-infection with gastro-enteritis at a special unit for premature infants by an elaborate series of barriers, including ultra-violet screens, special kitchens, and cubicle isolation. This experience suggests that our failures in preventing cross-infection may be due simply to insufficient standards of asepsis—such as might be expected, for example, in operating theatres where rubber gloves or masks were not used.

Whether such elaborate measures for preventing cross-infection (assuming that they work) are justified depends on the clinical hazards of infection in each particular field. In any case, however, it would be of the greatest value to have special units in which a maximum level of asepsis could be assessed for effectiveness in preventing different kinds of infection, and for guidance in planning of hospitals to-morrow. It is not enough (cf. Goodall, 1952) to attribute our failures to faulty nursing or to inadequate fulfilment of the recommendations laid down in the memoranda of the Medical Research Council (1941, 1951) on control of hospital infection. Scrupulous observance of these recommendations may not, as we have seen, prevent some kinds of cross-infection. If the recommendations are to be saved from merely ritual observance—or uncritical disuse—they must be subjected to a more detailed assessment than has yet been possible.

Even without such elaborate special units, however, there is scope for the investigation of many ideas—for example, the admission of mothers as auxiliary nurses for their own children in hospital (Pickerill and Pickerill, 1954); the use of a disinfectant barrier to prevent contamination through soaked dressings (Lowbury and Hood, 1952); the use of rubber gloves for many duties in hospital wards; the use of chemotherapeutic agents for suppressing the skin carriage (Murray and Calman, 1955), and the nasal carriage (Moss *et al.*, 1948; Valentine and Hall-Smith, 1952) of *Staph. aureus*—methods which may cause some reduction in the cross-infection rate with that organism (Gould and Allan, 1954).

There is some danger that advances in surgery which were made possible by the arrival of antibiotics will be relinquished as the staphylococci surmount each new chemotherapeutic obstacle. The physical obstacles, such as air-conditioning, cannot be surmounted in this way; nor, apparently, can the older chemical obstacles—for example, disinfectants such as phenol and the cresols. Although our attention to-day is drawn to combined chemotherapy as the most hopeful weapon against the emergence of resistant forms, it is too early to assume that no substance will be discovered which is as safe as penicillin and as permanent in its effects against *Staph. aureus* as phenol, and perhaps hibitane.

Summary

The prevalence of antibiotic-resistant organisms—especially staphylococci—causing added infection of wounds in hospital patients has emphasized the limitations of chemotherapy and of hygiene applied in this field.

Emergence and spread of resistant organisms are considered in this paper as separate problems. To combat the former, efficient dosage and a combination of two or more agents has been advocated. In our hands, local application of neomycin and of "hibitane" has had some prophylactic effect against staphylococci in burns, so far not accompanied by the emergence of any resistant strains. Methods to control the spread of bacteria by air and by contact have been considerably developed in recent years, but more knowledge of their performance is needed. Some further improvements are suggested by existing data—for example, the general use of positive-pressure ventilation with filtered air for operating theatres and dressing stations. For the more complex task of limiting the transfer of infection in the ward, many changes (in hospital design and in nursing routine, for example) require investigation.

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PATHOGENIC STAPHYLOCOCCI IN THE ENVIRONMENT OF THE NEWBORN INFANT

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Improved hygiene and the development of potent antibacterial agents have been responsible over recent years for a considerable reduction in the amount of neonatal infection, particularly infection of the alimentary and respiratory tracts. Staphylococcal infection of the newborn, especially in hospital, is, however, still a problem, and the marked tendency of the staphylococcus to acquire resistance to antibiotics has retarded its control and increased its relative importance.

The objects of the present investigation are to report and compare the carriage rates and antibiotic resistance of staphylococci in three maternity hospital units of different types; to compare these hospital results with corresponding data obtained from domiciliary confinements; to correlate staphylococcal carriage with clinical infection; and to study the mode of spread of the organism between mothers, babies, and hospital staff.

Materials and Methods

The hospital units concerned are (*a*) a maternity unit adapted from an old building, somewhat crowded and part of a general hospital (hospital W); (*b*) a newer and more spacious unit, also part of a general hospital, with better facilities for isolating infected patients (hospital E); and (*c*) a small self-contained maternity hospital with adequate accommodation situated in the country (hospital M). The period of the investigation was from March to July, 1952.

Altogether 608 vaginal swabs and 701 nasal swabs taken on admission from 770 mothers in these three hospital maternity units and 44 nasal and 44 vaginal swabs from mothers confined at home were examined for the presence of pathogenic staphylococci, and their sensitivity to four antibiotics and to sulphonamide was determined. Specimens taken from the offspring of these mothers included 683 conjunctival and 639 umbilical swabs, from a total of 774 babies. Eye swabs (E_4) were taken four days after delivery of the infant, since it has been shown that the carrier rate reaches its maximum about this time (Torrey and Reese, 1945). Umbilical swabs (U_8) were taken as soon as the cord had separated—that is, about the eighth day after birth. From the medical, nursing, and domestic staff attending these cases during the period of the survey, 245 nasal swabs were examined.

In order to ascertain whether mothers acquired pathogenic staphylococci while in hospital, 293 nasal and 297

vaginal swabs taken approximately eight days after admission were examined in addition to those taken on admission.

Swabs were plated out on nutrient agar within 24 hours and the plates incubated at 37° C. for 18 to 24 hours. The resulting growths were tested for coagulase production and if positive were tested by the disk technique of Gould and Bowie (1952), modified as described by Forfar *et al.* (1953), for sensitivity to chlortetracycline ("aureomycin"), chloramphenicol, penicillin, streptomycin, and "soluthiazole" (a soluble derivative of sulphathiazole). Four different possible results were recognized—3 (highly sensitive); 2 (moderately sensitive); 1 (slightly sensitive); 0 (resistant). The approximate relationships between these conventions and (1) the coefficient of resistance, and (2) the minimum inhibitory concentration, are given in the paper by Forfar *et al.* (1953). We used the drug-resistance pattern as a means of identifying or labelling an organism. Because of the margin of error in all sensitivity-testing techniques, however, the following methods were used in labelling organisms according to their reactions to the five drugs concerned:

(1) For the purpose of overall "resistance patterns" as given in Tables II–VI the organisms were labelled as either "sensitive" or "resistant." Thus grades 3 and 2 were grouped together as "sensitive" and grades 1 and 0 as "resistant."

(2) In comparing one individual organism with another, as is done in Table VIII, a difference of more than one grade of sensitivity was required in order to distinguish two strains as different. Thus a strain giving grades 3, 2, 3, 0, 3 for the respective drugs was considered to have the same sensitivity pattern as one giving grades 3, 2, 3, 0, 2, since only one degree of difference was present in respect of the last drug. A strain giving the pattern 3, 2, 3, 0, 1 would, however, be regarded as definitely different from the first-mentioned strain. This differentiation is made on the assumption that only in a very small proportion of strains could mutation occur in the short period during which specimens were taken from a mother and/or baby.

(3) Where comparison with the results of previous workers is involved, resistance rates include only those organisms giving complete *in vitro* resistance—that is grade 0.

While this method of labelling lacks the precision of serological and phage-typing methods, it does enable recognition of different strains to be achieved with a high degree of probability, although two strains giving the same pattern may not necessarily be identical. The disk-diffusion technique has, too, the advantage that it enables a large number of tests to be quickly performed, so that the numbers large enough to give statistically significant results may be readily obtained.

Where two percentages are compared, the difference between them is said to be significant when the observed difference is more than two and a half times the standard error of the difference.

Results

Carriage rates for coagulase-positive staphylococci are given in Table I for the three hospital units and for the domiciliary cases investigated. It will be seen that the carriage rate for the first-day vaginal swabs for the combined hospitals (3.5%) rose by the eighth day of stay in hospital to 10.8%. This is a statistically significant increase, but there is no corresponding rise in the maternal nasal carriage rate, nor is there any significant difference between the nasal carriage rates of mothers at home and in hospital.

The vaginal carriage rate of the mothers at the time of delivery is so low that vaginal contamination cannot be a significant source of infection of the infant.

Both the E_4 and U_8 staphylococcal carriage rates for babies born at home are significantly less than those for hospital-born babies. This is despite the fact that the carriage rate for the domiciliary nursing staff is the same high figure (55 to 56%) as that for the hospital W staff (where in fact the domiciliary nurses are accommodated) and shows that the domiciliary nursing staff did not pass on their staphylococci to any extent to babies born at home.

The highest carriage rate shown in Table I is the hospital staff nasal carrier rate (51% for the combined hospitals), but the U_8 rate approaches nearly to this level.

In Table II, for the combined hospitals, the antibiotic-resistance patterns of staphylococci from various sites on mother, baby, and nursing staff are shown. It will be noted that in parallel with the lower carriage rate for the mothers there is a lower incidence of drug resistance among the staphylococci carried by them. Among the staphylococci isolated from the babies and from the nursing staff penicillin resistance is of a high order. A fairly close resemblance is seen between the antibiotic-resistance patterns of staphylococci from the babies and staff, but there is an obvious difference between these staphylococci on the one hand and those of the mothers on the other.

Table III sets out the consolidated totals of coagulase-positive staphylococci isolated from mothers, from routine carriage swabs from babies (E_4, U_8), from clinical infections of babies, and from nursing staff subgrouped according to

TABLE I.—*Carriage Rates for Coagulase-positive Staphylococci*

Specimens		Hospital W	Hospital E	Hospital M	Total	Domiciliary
1st-day swabs from mothers:						
Nasal	C.R. %	30·4	25·6	31·7	28·7	22·8
	N.S.	303	278	120	701	44
Vaginal	C.R. %	2·8	4·0	3·3	3·5	0
	N.S.	214	273	121	608	44
8th-day swabs from mothers:						
Nasal	C.R. %	37·0	27·3	22·2	30·7	
	N.S.	127	121	45	293	
Vaginal	C.R. %	7·8	14·9	8·3	10·8	
	N.S.	128	121	48	297	
Eye swabs from 4-day-old babies	C.R. %	32·8	44·5	16·0	35·3	5·0
	N.S.	262	281	100	643	40
Umbilical swabs from 8-day-old babies	C.R. %	53·5	25·0	52·7	40·1	8·6
	N.S.	226	283	95	604	35
Staff nasal swabs	C.R. %	56·3	51·5	40·4	51·3	55·6
	N.S.	96	93	47	236	9

C.R. = Carriage rate. N.S. = No. of swabs taken.

TABLE II.—*Antibiotic-resistance Patterns in Combined Hospitals: W, E, and M*

Specimens	% Coagulase-pos. Staph. Resistant to: Sulphonamide	Chlortetracycline	Chloramphenicol	Penicillin	Streptomycin	Total Coag.-pos. Staph.
1st-day swabs from mothers:						
Nasal	4·1	1·4	2·7	19·4	0	222
Vaginal	14·3	4·8	4·8	28·6	9·5	21
8th-day swabs from mothers:						
Nasal	8·7	1·1	1·1	29·3	2·2	92
Vaginal	11·4	2·9	2·9	51·5	5·7	35
Eye swabs from 4-day-old babies	19·2	3·4	11·7	76·2	12·5	239
Umbilical swabs from 8-day-old babies	27·4	3·8	5·3	80·3	9·9	263
Staff nasal swabs	19·3	2·4	7·3	74·2	4·0	124
Clinical infection swabs from babies	17·0	10·6	8·5	85·0	8·5	47

TABLE III.—*Comparison of Resistance Patterns of Staphylococci from Mothers, Babies, and Staff in the Combined Hospitals W, E, and M*

	Coagulase-pos. Staph. Resistant to: Sulphonamide	Chlortetracycline	Chloramphenicol	Penicillin	Streptomycin	Total Coag.-pos. Staph.	Total Swabs
Mothers	24	6	9	94	6	370	1,899
Babies (carriage)	118	18	42	393	56	502	1,247
Babies (clinical infections)	8	5	4	40	4	47	87
Staff	24	3	9	92	5	124	236

TABLE IV.—χ^2 *Analysis of Strains Resistant and Sensitive to Drugs in Left-hand Column, Data Shown in Table III*

χ^2	Mothers, Babies (Carr.), Babies (C.I.), Staff	Babies (Carr.), Babies (C.I.), Staff	Mothers, Babies (Carr.)	Mothers, Babies (C.I.)	Mothers, Staff	Babies (Carr.), Babies (C.I.)	Babies (Carr.), Staff	Babies (C.I.), Staff
Sulphonamide	42·8	1·80	44·5	6·59	8·9	1·04	0·93	0·13
P=	<0·001	0·42	<0·001	0·01	0·005	0·30	0·35	0·73
Chlortetracycline ..	12·0	6·58	2·97	13·8	0·33	5·30	0·40	5·16
P=	0·009	0·04	0·09	<0·001	0·62	0·02	0·53	0·02
Chloramphenicol ..	14·1	0·17	13·8	4·76	6·13	0·004	0·16	0·07
P=	0·005	0·92	<0·001	0·03	0·01	0·97	0·90	0·80
Penicillin	276·7	2·47	242·2	68·8	94·0	0·43	0·92	2·28
P=	<0·001	0·29	<0·001	<0·001	<0·001	0·15	0·35	0·13
Streptomycin	33·5	5·85	20·2	8·8	2·9	0·31	5·71	1·32
P=	<0·001	0·06	<0·001	0·005	0·10	0·60	0·02	0·25
$\Sigma\chi^2$	379·1	16·87	323·67	102·75	112·2	7·084	8·12	8·96

their antibiotic resistance. In Table IV the χ^2 test has been applied to these figures, and in each case antibiotic resistance has been the character tested. The test has been applied to the group comprising mothers, babies (carriage), babies (clinical infections), and staff; to this group with the mothers omitted; and to the six possible pairings within the group. It will be seen that with the group comprising mothers, babies (carriage), babies (clinical infections), and staff high χ^2 values are obtained, and there is, therefore, a very low probability of similarity between the members of the group; whereas, when the mothers are left out, relatively low χ^2 values are obtained, hence there is a very much higher probability that the organisms from the group comprising babies (carriage), babies (clinical infections), and staff are similar. This is shown even more clearly when the summed χ^2 from mothers, babies (carriage), babies (clinical infections), and staff is compared with the summed χ^2 from babies (carriage), babies (clinical infections), and staff.

In other words, there is a very close similarity between those staphylococci carried on the baby, those isolated from clinical infections of the baby, and those carried by the staff, but no relationship between the mothers' staphylococci on the one hand, and those from the babies (carriage and clinical infections) and staff on the other. It is thus highly probable that there is a free interchange of staphylococci between the nursing staff and babies, and between one baby and another, but mothers seem not to be a significant source of infection to the infant.

This is further confirmed when the χ^2 test is applied to individual pairs—that is, mothers/babies (carriage), mothers/babies (clinical infections), mothers/staff, staff/babies (carriage), staff/babies (clinical infections), and babies (carriage)/babies (clinical infections). Again the high χ^2 values (and therefore low probability of similarity) obtained in comparing the mothers' organisms with those from the babies and nursing staff contrast with the low χ^2 values (and therefore high probability of similarity) obtained on comparing staff and babies (carriage and clinical infections), and babies (carriage) and babies (clinical infections).

Table V shows no significant difference in drug-resistance patterns between hospitals W, E, and M, but shows that domiciliary staphylococci gave a lower penicillin-resistance rate of 23% as compared with 65 to 76% for the hospitals.

TABLE V.—*Comparison of Resistance Patterns in Hospitals W, E, and M, and in the Home (Pooling Hospital Results from Mothers' 8th-day Swabs, Babies' Swabs, and Staff Swabs; and All Domiciliary Swabs)*

Hospital	% Coagulase-pos. Staph. Resistant to					Total Coag.-pos. Staph.
	Sulphonamide	Chlortetracycline	Chloramphenicol	Penicillin	Streptomycin	
W ..	19·3	3·3	7·9	74·7	8·2	367
E ..	17·7	3·1	8·1	65·7	9·9	323
M ..	30·8	6·4	1·8	76·4	6·4	110
Total Home	20·2	3·6	7·1	71·3	8·6	800
	23·5	0	0	23·5	11·8	17

Although this is not statistically significant, owing to the small numbers of *Staphylococcus pyogenes* isolated from domiciliary cases in the series, the difference is highly suggestive and reflects the well-known fact that staphylococcal penicillin-resistance rates are much lower among the general population than in hospitals.

Table VI compares the resistance patterns of babies' staphylococci (from E_4 and U_8 swabs) in the three units. Apart from a somewhat higher incidence of sulphonamide resistance in hospital M than in hospitals W and E, no significant difference is seen between the figures for the three hospitals.

TABLE VI.—*Comparison of Resistance Patterns in Hospitals W, E, and M of Babies' Staphylococci (E_4 plus U_8)*

Hospital	% Coagulase-pos. Staph. Resistant to					Total Coag.-pos. Staph.
	Sulphonamide	Chlortetracycline	Chloramphenicol	Penicillin	Streptomycin	
W ..	20·7	4·0	9·7	77·6	11·0	227
E ..	22·1	2·0	9·3	77·6	12·8	204
M ..	38·3	8·8	1·5	86·8	7·4	68

Table VII shows the incidence of septic eye and skin infections in the various hospitals and the combined incidence for the hospitals. There is no significant difference between the total infection rates in the three units, but among these infections eye infections occurred significantly more often in hospital M (92% of infections occurred in the eye) than in hospital W (52% of infections), while, correspondingly, skin sepsis was significantly lower in hospital M (8% of infections) than in hospital W (48% of infections). The proportion of clinical infections in which *Staph. pyogenes* was isolated was lower in hospital M (35%) than in hospital W (59%) or hospital E (50%).

The ratio *Staph. pyogenes* sepsis rate/*Staph. pyogenes* carriage rate was 1/4.6 for hospital W, 1/5.5 for hospital E, and 1/5.8 for hospital M, when E_4 and U_8 swabs and sepsis of the skin and conjunctivae are included. Although hospitals W and E showed similar ratios for eye-sepsis rate/eye-carriage rate and for skin-sepsis rate/umbilical-carriage rate, hospital M showed a relatively high ratio for the former and a relatively low ratio for the latter. Thus the rate of infection and the rate of carriage do not always run parallel to each other.

Table VIII shows the comparison in sensitivity patterns between staphylococci isolated from each member of 125 mother/baby pairs. In 34% of these pairs the two strains concerned had the same patterns of sensitivity to the five drugs used in the tests; that is to say, they could have been the same organism, though it does not necessarily follow that they were; in the remaining 66% the two strains had different sensitivity patterns and were therefore not the same. One can conclude from this that the majority of babies acquire staphylococci from a source other than their mothers. In view of the very much higher carriage rate on

TABLE VII.—*Incidence and Bacteriology of Clinically Recognizable Infections in Babies*

Hospital	Total Admissions to Baby Nurseries During Period of Investigation	Clinical Infections, with Percentage of Total Admissions			Bacteriological Investigation of Clinical Infections. Percentages are of Number of Swabs Taken			
		Conjunctivitis	Skin Sepsis	Total	Coag.-pos. Staph. Isolated	Coag.-neg. Staph. or Other Organisms Isolated	No Organisms Isolated	No Swab Taken
W	326	26 (8·0%)	24 (7·4%)	50 (15·4%)	26 (59%)	11 (25%)	7 (16%)	6
E	349	32 (9·2%)	13 (3·7%)	43* (12·3%)	14 (50%)	7 (25%)	7 (25%)	15
M	141	22 (15·6%)	2 (1·4%)	24 (17·0%)	6 (35%)	6 (35%)	5 (29%)	7
Total ..	816	80 (9·8%)	39 (4·8%)	117 (14·3%)	46 (52%)	24 (27%)	19 (21%)	28

* Two patients had both conjunctivitis and skin sepsis.

TABLE VIII.—*Comparison, by Sensitivity Patterns, of Coagulase-positive Staphylococci from Mother and Child, and of Strains From Two Sites in the Same Infant*

	Hospital	Where 2 Strains Had Same Sensitivity Pattern, *i.e.*, Could be Same	Where 2 Strains Had Different Sensitivity Patterns, *i.e.*, Strains Not Same
Mother/baby pairs where a coag.-pos. staph. was isolated from at least one swab from mother and baby	W	25	36
	E	16	29
	M	2	17
	Total	43 (34%)	82 (66%)
Normal babies in whom a coag.-pos. staph. was isolated from both eye and umbilicus	W	15	16
	E	19	15
	M	7	5
	Total	41 (54%)	36 (46%)
Babies in whom a coag.-pos. staph. was isolated both from a septic lesion and from another clinically unaffected site	W	10	10
	E	6	4
	M	1	4
	Total	17 (49%)	18 (51%)

baby than on mother, however, it may be that to an appreciable extent the mother acquires her staphylococci from her infant.

Table VIII also shows that, where organisms were isolated from two sites on the same baby, on only half of the occasions could these have been the same organism. This was equally true whether one of the sites was clinically infected or not. One should therefore not assume that a staphylococcus isolated, for example, from the skin is the same as that causing infection elsewhere in the body. Specimens for examination for drug sensitivity should be taken from each available locus and reported on separately.

Discussion

The coagulase-positive staphylococcal carriage rates for mothers' nasal swabs of 28.7% (first day) and 30.7% (eighth day) obtained in this series compare with the rates of 21% given by Torrey and Reese (1945), 28% by Parker and Kennedy (1949), 42.6% by Rountree and Barbour (1950), and 36% by Ludlam (1953). No significant increase occurred either in the carriage rate or the penicillin-resistance rate of staphylococci isolated from the nose between the first and eighth days of the mothers' stay in hospital. There was, however, a significant rise in the vaginal carriage rate during this period. The carriage rate in infants in hospital rose from presumably nil at birth to 35.3% by the fourth day of life (eye swabs), and to 40.1% by the eighth day (umbilical swabs). These are low figures compared with others previously published, yet a comparison with the figures for babies born at home (5% and 8.6% respectively for the fourth- and eighth-day specimens) demonstrates the great importance of the hospital environment in increasing the staphylococcal carriage rate of the newborn.

The low figures for carriage in babies born at home occurred in spite of the fact that they were attended by nurses from hospital W, who had the same high incidence of staphylococcal carriage as other hospital nurses. This shows that the limited contact occurring between domiciliary nursing staff and the babies was relatively ineffective in spreading staphylococcal infection to these infants.

Other authors have given much higher figures for infant carriage of *Staph. pyogenes* after the fourth day of life—for example, 89% (Torrey and Reese, 1945), 100% (Cunliffe, 1949), 88.9% (Rountree and Barbour, 1950), and 75% (Barber *et al.*, 1953). We also gave a higher figure (60%) in a previous publication (Forfar *et al.*, 1953) for umbilical swabs from hospital W in 1951, and it may be that improved medical care and hygiene have contributed to this fall in staphylococcal carriage in infants. This decrease is not due to a reduction in numbers of staphylococci carried by the hospital staff, since their staphylococcal carriage rate has remained practically unchanged. Thus the present average figure of 51.3 for the combined hospitals compares with 64% given by Miles *et al.* (1944), 52% by Williams (1946), 58–68% by Barber *et al.* (1949), 54.5% by Rountree and Barbour (1950), 21–50% by Ludlam (1953), and 53% by Forfar *et al.* (1953).

On the other hand, the combined hospital rates for eye and skin sepsis in the present series (9.8% and 4.8% respectively) are high compared with some recently published figures—for example, 4.2% and 2.3% respectively given by Forfar *et al.* (1953), 9.2% and 3.6% by Barber *et al.* (1949), and 0.61% and 1.58% by Frazer (1948). It must be emphasized that the infections recorded in the present investigation were in the main trivial, and serious infection was entirely absent. The results were therefore similar in this respect to those of Barber *et al.* (1953), who reported high sepsis rates accompanied by an absence of serious infection. The apparent increase in the sepsis rates recorded in this series therefore reflects the increased care with which early mild infections were recognized and treated. We feel that early recognition and early and adequate treatment of all minor staphylococcal infection is an important factor in preventing more serious infection.

The incidence of complete penicillin resistance among hospital strains of *Staph. pyogenes* in the present series was 57.6%* for staff nasal swabs and 64.7%* for babies' fourth- and eighth-day swabs. The figure for nurses compares with 70 to 80% given by Barber *et al.* (1949), 64% by Rountree and Barbour (1950), 56% by Rountree and Barbour (1951), 75 to 85% by Ludlam (1953), and 30.7% by Forfar *et al.* (1953) for hospital W in 1951. The figure for babies compares with 90% given by Barber *et al.* (1953), and 64.4% by Forfar *et al.* (1953).

More than 90% of pathogenic staphylococci were still sensitive to chlortetracycline and chloramphenicol during the period of the present investigation, and almost as great a proportion were sensitive to streptomycin. The mean sulphonamide resistance percentage for all swabs was 16.8%, although in the case of hospital M babies the rate was as high as 38.3%.

Duncan and Walker (1942), Allison and Hobbs (1947), Parker and Kennedy (1949), Barber *et al.* (1949), and other authors, using serological and phage-typing methods, have shown that infection is usually conveyed in hospital maternity units from baby to baby, from staff to baby, or from blankets, dust, etc., to baby. This is borne out by the present investigation, since drug-resistance patterns

*Grade 0 only.

showed a considerable degree of uniformity among staphylococci from babies and staff, but no such uniformity between babies and staff on the one hand and mothers on the other.

The results for mother/baby pairs given in Table VIII are in keeping with the view that few infants are infected from their mothers. The actual proportion infected from this source must be much less even than the 34% of cases in which the two strains infecting mother and child could be the same. Some of these will have been different strains with the same sensitivity patterns, and even if they were identical there remains the likelihood that the mothers were infected from their babies and not vice versa.

The three maternity units W, E, and M were chosen because of the considerable differences between them—the crowded older buildings of hospital W contrasting with the more modern and spacious unit at hospital E and the separate maternity hospital M situated in the country. One would therefore have expected that staphylococcal carriage rates would have been higher in hospital W than in E or M, and that hospital W babies would have acquired more staphylococci from the nursing staff than in hospital E or M. In fact, however, staphylococcal carriage rates were at a similarly high level for the babies of all three units, and the resistance rates against the various drugs were similar for the staphylococci isolated from each of the three hospitals, with the exception of sulphonamide resistance, which occurred significantly more often in hospital M than in hospitals W and E (38.3% as against 20.7% and 22.1% respectively). Another point of similarity between the results from the three units was in respect of the ratio *Staph. pyogenes* sepsis rate/*Staph. pyogenes* carriage rate. Although hospital M showed differences where eye and skin sepsis/carriage ratios were examined individually, the overall ratio of 1/5.8 for hospital M compared with 1/5.5 for hospital E, and 1/4.6 for hospital W. There is thus no evidence in this investigation to show that the nature of the hospital buildings or their proximity or otherwise to other hospital departments had any effect on the spread of staphylococcal infection in the units concerned.

Summary

Over 51% of the members of the nursing, medical, and domestic staff in three Edinburgh maternity units were found to be carrying *Staph. pyogenes* in their anterior nares. Of these staphylococci, 58% were completely resistant to penicillin and nearly 20% were resistant to sulphonamide. Less than 10% were resistant to chloramphenicol, chlortetracycline, and streptomycin.

The staphylococcal carriage rates of the mothers admitted to, and babies delivered in, these units was determined. The mothers' vaginal carriage rate was 3.5% and their nasal carriage rate was 28.7%. Of these, only the vaginal carriage rate rose during an eight-day period.

The babies' eye carriage rate on the fourth day after delivery was 35.3% and the umbilical carriage rate on the eighth day was 40.1%. The corresponding carriage rates for babies born at home were 5% and 8.6%.

As between three different maternity units of different type there was little difference in the mothers, babies, and staff carriage rates.

There was a much higher incidence of penicillin-resistant strains among nurses and babies than among mothers, and among week-old babies born in hospital than among those born at home. Individual hospitals showed little difference in antibiotic-resistance rates.

A relatively high frequency of mild skin and conjunctival sepsis contrasted with a complete absence of serious infection in this series.

The great majority of infants acquired their staphylococci from sources other than their mothers, chiefly from the nursing staff and from other babies. Despite the fact that there was a high carriage rate among the nurses attending babies born at home the carriage rate on these babies remained low.

Where infants carried staphylococci on two different sites (eye and umbilicus), in approximately half the cases the staphylococci had different drug-sensitivity patterns.

On the clinical side we wish to thank the maternity nursing staffs of the Eastern and Western General Hospitals, Edinburgh, and Musselburgh Maternity Hospital for their wholehearted co-operation; the obstetricians of the units concerned; and the general practitioners who gave assistance, particularly Dr. E. V. Kuenssberg. We also wish to thank Dr. Lilli Stein for generous statistical advice and criticism. On the bacteriological side we wish to thank Professor T. J. Mackie and Dr. H. A. Wright for their advice and criticism, and the technical staff of the Department of Bacteriology of Edinburgh University.

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MANAGEMENT AND TREATMENT OF PATIENTS WITH COAL-WORKERS' PNEUMOCONIOSIS

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Coal-workers' pneumoconiosis is an important industrial disease. In 1947 it was estimated that there were about 16,000 certified cases in South Wales and at least an equal number uncertified (Hugh-Jones and Fletcher, 1951). Since then an increasing awareness of the condition and more frequent radiological examinations have led to more cases being revealed in other parts of Great Britain. The number of new cases certified each year in South Wales rose steadily from 44 in 1931 to 5,224 in 1945, but declined to 1,079 in 1953. In the rest of Great Britain the number has been rising steadily, passing the figure for South Wales in 1951, to reach 2,987 by 1953 (Ministry of Fuel and Power, 1954). It is therefore likely that an increasing number of practitioners who have not met the condition before may be asked for advice about it by patients who are or have been miners. Although there is no specific therapy, the reassurance derived from a better understanding of the condition can be a real help, and in the more disabled case treatment of symptoms and complications is both possible and often quite effective.

Questions about re-employment and compensation are likely to arise. This article therefore includes an

outline of the present compensation arrangements and the scheme which enables a miner who is in receipt of disablement benefit to continue working underground under certain safeguards.

Pathogenesis of Coal-workers' Pneumoconiosis

Coal-workers' pneumoconiosis has two distinct but related forms. The first, simple pneumoconiosis, caused by the gradual accumulation of the fine dust (less than 10 μ diameter) in the lungs, is recognized radiologically by the characteristic minute opacities (0.5–1 mm.) which are often best seen in the early stages in the right upper and mid-zones. Its radiological severity is classified into three categories (1, 2, and 3) dependent principally on the profusion of the opacities (Cochrane *et al.*, 1951). The condition advances as such only if the miner continues to work in a dusty environment, but it makes the subject liable to the second form of the disease—complicated pneumoconiosis. In South Wales between 1 and 2% of men with simple pneumoconiosis (category 2 or over) develop complicated pneumoconiosis each year. The figure for other areas is not known, but the prevalence of complicated pneumoconiosis is almost certainly lower in most other coal-fields in this country. The condition is recognized radiologically by the appearance of additional larger localized opacities which correspond to the massive fibrosis found pathologically; it progresses whether or not dust exposure is continued, often develops after cessation of exposure to dust, and is much the more disabling form of the disease. The massive fibrosis is believed to be caused by tuberculosis modified by the presence of coal-dust—a hypothesis based on clinical, radiological, and pathological findings. Tubercle bacilli may be isolated from about 40% of cases at necropsy but in less than 10% of cases coming to hospital.

The prevention of serious disability from pneumoconiosis, therefore, depends both on reducing exposure to coal-dust to a level where simple pneumoconiosis does not occur to an appreciable extent during a working life, and on eliminating the risk of infection by tuberculosis. This can be achieved only by energetic measures to detect and treat all infectious cases both in miners and in the community in which they live (Rogan, 1954). By using full-size films and good radiographic technique it is possible to detect an early stage of simple pneumoconiosis (category 1) at which the risk of developing complicated pneumoconiosis is very small. Thus a system of periodic *x*-ray examinations (Cochrane *et al.*, 1951) could assist in preventing the more disabling form of the disease by detecting those men who were approaching the dangerous stage of the disease.

Coal-workers' pneumoconiosis is different both pathologically and in its natural history from the classical form of silicosis found in men who have worked in dusts containing a high proportion of silica.

Diagnosis

The symptoms of increasing breathlessness on exertion disproportionate to his age, cough, pain in the chest, and lassitude in a man who has worked in the mines for a number of years should raise the suspicion that he may have pneumoconiosis. The only pathognomonic feature is the expectoration of inky black sputum, but this is likely to occur only when complicated pneumoconiosis is well established.

Physical signs in the chest are of little help in establishing the diagnosis, which can be made with certainty only on the basis of the industrial history and the chest radiograph. The striking radiographs of well-established simple pneumoconiosis and the remarkable appearances of complicated pneumoconiosis may surprise physicians not familiar with the condition, and possibly lead to the assumption that patients are more seriously ill than is in fact the case. The typical formation of the opacities of complicated pneumoconiosis by a process of aggregation on a background of simple pneumoconiosis and their slow progression will usually differentiate the condition from carcinoma or tuberculosis. Extensive cavitation in the massive lesions of complicated pneumoconiosis is common but does not prove the existence of overt tuberculosis or even of an especially poor prognosis (Kilpatrick, Heppleston, and Fletcher, 1954).

Relationship of Radiographic Appearances and Age to Disability

Although simple pneumoconiosis is not, on the average, the cause of serious disability when large and unselected groups of miners are studied, there is of course a tendency for the general practitioner to see only those men who are becoming breathless to an extent which interferes with their work. Age is an important factor. Breathlessness of severe degree on account of simple pneumoconiosis is rare under the age of 50. Complicated pneumoconiosis may be a cause of serious disability at a much earlier age, but, even so, it is not infrequent, at least in South Wales, for men in the forties with quite advanced complicated pneumoconiosis to continue work without serious symptoms.

The term "pneumoconiosis" covers a wide range of conditions, from the man with the earliest detectable category of simple pneumoconiosis to the one with the whole lung destroyed by massive fibrosis. The miner is likely to be more familiar with the effects produced by the latter and may therefore be under a serious misapprehension about the gravity of his condition. An explanation to men with simple pneumoconiosis, who form the majority, that their lungs show evidence of dust accumulation but that it may cause them no more disability than the pigmented coal scars on their hands, often puts their condition in a new perspective. Coal-workers' pneumoconiosis at any stage is a slowly changing condition, and even quite seriously disabled men with complicated pneumoconiosis may be able to look forward to a number of years of useful life provided they find a job within their capacity.

In explaining the condition to men with category 1 simple pneumoconiosis we avoid using the word "pneumoconiosis." We think it is more helpful to tell the man that it is possible to guess by looking at his radiograph that he has worked in the mines and that some of the dust he has breathed has stayed in his lungs. This category can be diagnosed with reasonable certainty only on films of excellent technique. At this stage the miner is not liable to attack by complicated pneumoconiosis, and there is even some evidence that men with this category are less liable to develop infectious tuberculosis than miners with normal films (Cochrane, 1954). They can therefore hardly be said to have a "disease" on the radiological evidence. The earliest *x*-ray indication of dust retention in the lungs therefore occurs before the prognosis is adversely affected.

To men with category 2 and over, even if there are no symptoms, we think it is wise to explain the position

fully. If nothing is said about their chest radiograph, they will assume that it is normal, but at any time they may be diagnosed as having pneumoconiosis as a result of attending a mass miniature radiography unit or if they apply to the pneumoconiosis panel. A misunderstanding may then arise. The other reason for a full explanation is that under the Industrial Injuries Act any miner with diagnosable disease is eligible for some compensation even though his disability may be very slight.

It may be argued that to encourage a man with minimal disability to apply for compensation may have a bad psychological effect. In our experience this very rarely occurs if the position is fully explained.

Compensation

The various schemes for providing compensation for coal-miners with pneumoconiosis have gradually widened the circle of those eligible. Compensation for silicosis arising in coal-miners was started in 1928, but applied only to those who had worked in specified jobs. The Workmen's Compensation Act (W.C.A.) of 1943 extended the provisions to cover all types of job and forms of pneumoconiosis. Under this scheme the miner certified as having pneumoconiosis was awarded compensation, the amount of which depended on the degree of disability, assessed as either partial or total. He could either claim a weekly benefit or commute his claim for a lump sum. Miners receiving payments under this scheme (including those who commuted their claims) are not in general eligible for benefit under the present National Insurance Industrial Injuries Act (I.I.A.), 1946, which came into force on July 5, 1948, and applies to all miners employed then and since. Under this scheme a miner diagnosed as having pneumoconiosis is eligible for a disablement benefit, which is additional to the sickness benefit obtained under the National Insurance Acts.

In 1951 special arrangements were made to enable certain miners who had been suspended under the W.C.A. but who did not have overt tuberculosis to return to the mines. Those who return come under the I.I.A.

In considering a claim a pneumoconiosis panel* of the Ministry of National Insurance proceeds in two stages. A diagnosis is made first, based on the radiographs and industrial history, and if pneumoconiosis is diagnosed the second stage, assessment of disability, follows. Disability is expressed on a percentage basis and can be as low as 1%, but the payments are graded in steps of 10%. In reaching a decision on the percentage assessment, all the circumstances are taken into account, and, where necessary, pre-existing causes of disability or those unrelated to pneumoconiosis are offset to reach a fair estimate of the loss of faculty caused by pneumoconiosis. The disablement benefit starts at 6s. 9d. weekly for those of 1% to 10% (inclusive), and rises to 67s. 6d. for 100%.

The miner may also be entitled to supplementary weekly benefits which are (1) a special hardship allowance (27s. 6d.); (2) an unemployability supplement (40s.) (with additions for married men, and those with children); and (3) a constant attendance allowance (up to 60s.).† His basic disablement pension is supplemented by about one-third under the Colliery Workers' Supplementary Scheme—a contributory pension scheme supported jointly by the National Coal Board and the colliery workers.

Whereas under the W.C.A. a miner was debarred from returning underground and suffered a reduction of his weekly benefit according to subsequent wages if he obtained a job, under the I.I.A. his benefit is a life pension and is unaffected by his subsequent earnings, and he may if he wishes continue working underground. Most assessments are provisional and miners are recalled for reassessment after a variable period, usually not exceeding three years. A miner who has tuberculosis or pneumoconiosis accompanied by overt tuberculosis may be compulsorily suspended. If the tuberculosis is active he will be given an assessment of 100%.

By a recent amendment of the regulations miners who have not worked in the mines since 1948 and who are not receiving payment under the W.C.A. may now apply for a certificate of partial or total disablement and if certified they may be eligible for supplementary benefits under the I.I.A.

In our experience the commonest misunderstandings which arise in the working of this scheme are as follows:

(1) Miners and others may have only a hazy idea of the meaning of the percentage assessments. Is it the amount of dust in the lungs? Is it a measure of the dust conditions in which the man may safely continue working underground? Is it the amount he is disabled? Therefore, it is hardly surprising that the man, to say nothing of his doctor, may have difficulty in appreciating the meaning of a 1% assessment. It is important that the miner should realize that the assessment is based on disability and that the *x*-ray film is used solely for establishing the diagnosis.

(2) The need to differentiate between the effects of more than one disease on disability may cause misunderstanding, and is perhaps commonest in men with, for example, hypertension or angina of effort, who may be totally disabled, but eligible only for, say, 40% assessment on account of pneumoconiosis. This problem also arises when a miner who has been assessed at a high percentage of disability in life dies of some cause quite unrelated to pneumoconiosis. A death claim may then be made by the widow and may be turned down. In some of these instances a discussion between the practitioner and the doctor at the pneumoconiosis panel might help to explain the situation to the relatives and avoid the perpetuation of a grievance.

(3) No precise level of radiographic abnormality for diagnosis of pneumoconiosis is laid down in the Act. Even if it were it has been well established (Fletcher and Oldham, 1949) that there is appreciable observer variability in reading films for pneumoconiosis, and thus a film near the borderline might be accepted as showing pneumoconiosis on one occasion and rejected on another. We have been impressed by how readily miners accept this idea of the inevitable uncertainty of reading some films. If a man is rejected at the first application he may apply again within three months, when the new film will be seen by two members of the panel who did not see the first film. To avoid advising men to go to the board when there is a high probability of their being rejected it seems in the best interests of all that consultants and practitioners seeing much of this disease should discover from the members of the local panel by informal discussion what level of abnormality is required for diagnosis. Variations in radiographic technique are an important factor in increasing disagreement in diagnosis. The use of automatic exposure controllers in the *x*-ray sets would help to reduce but would not eliminate this variation, as it is also due to variations in development technique.

(4) When a miner is recalled for reassessment of disability his benefit may be reduced. As most miners know that pneumoconiosis is not a condition which improves, this reduction may cause a real sense of grievance. In our experience downward assessments have usually resulted from the extreme difficulty of setting uniform standards of disability assessment when the I.I.A. first started. An explanation of this difficulty and of the possibility that assessment may have been made at the time of an acute chest infection is generally accepted by the miner as reasonable. A man may appeal (but in the case of a provisional assessment not normally under two years) and the case then goes to a tribunal.

Advice on Employment

Well-informed advice on problems of employment is of first importance to the miner with pneumoconiosis and is

*There are ten panels at present, situated in Bristol, Cardiff, Edinburgh, Glasgow, London, Manchester, Newcastle-upon-Tyne, Sheffield, Stoke-on-Trent, and Swansea.

†The rates are those which will come into effect in May, 1955, under the National Insurance Act, 1954.

often of greater value to him than anything else doctors can offer him. The opportunities open to him are now far better than they were under the W.C.A., and the figures for South Wales show the striking change since 1949. In that year there were 4,550 miners with pneumoconiosis unemployed on the Disabled Register; now there are 650.

The largest single factor has been the change of regulation which allows a miner to continue working underground. With the man's approval the pneumoconiosis medical panel informs the colliery manager of its findings, and provision is made to place the man in a job where conditions are "approved." The aim is, of course, to achieve these conditions for all places underground, and many more coal-faces are now "approved" than when the I.I.A. came into force.

The pneumoconiosis panel offers the miner advice on re-employment both at the time of his boarding and by letter. In 1953 75% of letters advised the men to continue in the industry under "approved" dust conditions; 12% recommended work on the surface in dust-free conditions, and about 6% advised leaving or remaining outside the industry; suspension on account of tuberculosis occurred in 2%. Thus a majority are advised to stay in the industry. By the end of 1953, of the 8,200 miners referred for employment under "approved" conditions in the mines, only a little over one-tenth rejected the advice. In over 80% arrangements were made for working in "approved" conditions (Ministry of Fuel and Power, 1954). These figures, however, do not show how many men had to move from better-paid jobs on the coal-face to other parts of the mine in order to work in "approved" conditions. At present the proportion who leave the coal-face varies considerably in different areas.

In the case of the moderately disabled man the combined effect of his disability and a wish to work out of the dust will often lead to his accepting a less strenuous and less remunerative job off the coal-face. The more difficult case is that of the younger man with heavy family financial commitments and only slight disability. If "approved" conditions can be ensured only by leaving the coal-face he may be unwilling to do this, as his small disablement benefit does not compensate for the large reduction in his weekly earnings. In these cases help may be obtained from the area or divisional medical officer of the Coal Board, who will know or can find out more about the dust conditions. Rapid improvements are now being made in the dust conditions, and in many instances face conditions which were recently not "approved" are now within these limits. In cases where difficulty is experienced in bringing one particular face within "approved" conditions the medical officer may be able to arrange employment on another face which is "approved" at the same pit, or in an adjacent one. In general it is usually to the man's financial advantage and not further damaging to his health to stay in the mine, provided conditions are approved and the job is within his physical capacity. However, each case needs individual assessment, taking into account age, disability, financial and other commitments, *x*-ray category, and past and present conditions in the mine.

The case for recommending a change of job to one outside mining is strongest in the young man who has shown in serial films rapid progression of simple pneumoconiosis towards category 2, particularly if he is unmarried and there is a reasonable chance of his getting good employment elsewhere. These cases are, however, unlikely to be detected except where periodic *x*-ray examinations are made. It may also be wise to advise a young man with complicated pneumoconiosis which has shown rapid radiological progression but with little disability to look for another job while he is still young and to get, if possible, one which he can expect to continue even if he becomes short of breath. Those men who are on the Disabled Register at the Labour Exchange can get help in finding a job by discussion with the disablement resettlement officer. A meeting of the almoner, doctor, and D.R.O. can assist the latter to select the most suitable type of employment. It also brings a more personal interest in the man's re-employment.

The commonest and the most difficult cases are the miners of 50 and over, both with and without pneumoconiosis, who have become moderately or severely disabled. The mining industry at present provides employment for many of these men, but there comes a time when they are unable to get to and from the mine and are frequently off work with exacerbations of their chronic chest infections. A few are able to get jobs as caretakers and live near their place of work, but many others are unable to get any work within their capacity, and they fall out of employment at a relatively young age. The men in this group who have normal chest films or pneumoconiosis of a category less than that accepted for diagnosis under the Act, and who have spent many years working underground, not unnaturally sometimes feel they have been treated harshly in not being eligible for compensation. It seems reasonable to explain to them that their disability is not caused by a recognizable form of pneumoconiosis and that they might have developed equally severe breathlessness in any other occupation. It is not yet possible to state whether or not after excluding men with pneumoconiosis there is among miners and ex-miners an unduly high proportion with respiratory disability.

Treatment

Many of the miners seeking advice on account of breathlessness find their symptoms worst in the mornings, in cold weather, and also during bouts of chest infection, especially in the winter months. Alleviation of the distress at these times depends primarily on controlling bronchospasm and chest infection.

Bronchospasm

Bronchospasm is frequently precipitated by sudden changes of temperature—for example, going upstairs to a cold bedroom or bed. We have been impressed by the amount of relief men claim they receive from the equable temperature of the hospital ward without any specific therapy. Some men have gained appreciable relief by moving their bed to a warmer downstairs room and avoiding so far as possible any sudden changes of temperature.

Adrenaline is less dramatic in its effect in most of these men than in a typical asthmatic but is of real use given by injection or inhalation at the time of acute attacks. Many men also find that adrenaline and atropine compound spray (*B.P.C.*) administered through a hand spray is effective enough to make it worthwhile carrying the spray in their pocket. A hand spray can be prescribed under the National Health Service. In some men a lack of understanding of how to use the spray properly and how to keep it in working order prevents their getting the maximum benefit from this form of therapy. In our experience the more complex and usually more expensive proprietary inhalants rarely give materially greater benefit than the simple *B.P.C.* preparation.

Of the many other bronchodilator drugs recommended we have found isoprenaline sulphate (*iso*propylnoradrenaline), ephedrine, aminophylline, hyperduric adrenaline, and occasionally khellin most generally useful. It may take a while to find the dose and timing of the drug or combination of drugs which provide the greatest relief with the minimum side-effects. Patients who respond well to adrenaline or hyperduric adrenaline may be taught to give the injections themselves. They gain considerable benefit physically and psychologically from knowing that they have a powerful remedy at hand when in need. In a very severe attack of bronchospasm, aminophylline (0.25 g.) intravenously has in our experience been the most useful agent and is often dramatically effective, if rather short-lived in effect. The occasional severe case which has failed to respond to other forms of treatment may benefit from cortisone. Atropine is occasionally of use in those with profuse watery expectoration.

Acute Pulmonary Infections

These are a very common cause of increased breathlessness and bronchospasm in winter. The severity of the infection may not be obvious from the temperature chart or the

physical signs in the chest, but the sputum, at least after the first two or three days, will usually show a change of character, becoming more yellow or often black if the miner has complicated pneumoconiosis. Penicillin in large doses—two mega units of combined procaine and crystalline daily—combined with streptomycin, 1–2 g. daily, is usually effective, the sputum changing rapidly in character and the dyspnoea and bronchospasm becoming less severe even if no antispasmodic treatment is given at the same time. Because repeated attacks of chest infection are common in this disease we have avoided using chloramphenicol, while chlortetracycline ("aureomycin") and oxytetracycline ("terramycin") have been reserved for those cases which fail to respond to penicillin or streptomycin. A full account of the value of different antibiotics in acute chest infections has been given by Stuart-Harris (1953).

When the chemotherapy is stopped the sputum often rapidly reverts to its previous condition, but the bronchospasm and dyspnoea do not usually return, at least for a while, to their previous severity. The benefit seems greatest when chemotherapy has been continued for some period after the patient has apparently improved.

If recurrent chest infections could be prevented much distress and incapacity would be avoided, but no beneficial effect was detected in a trial of the prophylactic value of sulphonamides (Kilpatrick and Oldham, 1954). However, it is our impression that if patients are treated really effectively from the onset with sufficiently large doses of effective antibiotics, the period in bed and of convalescence is considerably reduced. Much may be gained, therefore, by encouraging those who can readily detect the onset of their attacks to seek treatment at the *earliest* stage.

In men with less obvious infection it is difficult to assess how much this contributes to their breathlessness, and it is therefore worth trying a period of intensive therapy for a week to ten days.

Cough and Sputum

It is usual for dyspnoea to precede cough in men with pneumoconiosis, but in the later stages cough may be very troublesome, particularly early in the morning. When there is much mucoid or purulent sputum, postural drainage, even in the absence of proved bronchiectasis, is of considerable value. If before going to sleep they empty their lungs so far as is possible by lying over the edge of the bed, some men can get a reasonable night's rest. The early-morning cup of tea or glass of hot water to which has been added the simple sodium chloride compound mixture (*N.F.*) may help to relieve the morning period of acute distress. Full doses of syrup of codeine phosphate are of use in treating an unproductive and irritating cough.

Expectoration of jet black or nearly black sputum indicates necrosis in the centres of the areas of massive fibrosis. The condition is likely to cause alarm but is not of serious import, as it seems to have little effect on the prognosis and certainly does not prove the onset of overt tuberculosis. Reassurance and a precautionary examination of the sputum for tubercle bacilli is all that is required. Small haemoptyses are as common as black sputum in men with complicated pneumoconiosis, and again do not necessarily indicate the presence of tuberculosis. Severe haemoptyses are rare. The presence of frankly malodorous sputum is also rare, and suggests some other underlying disease such as bronchiectasis or lung abscess.

Pain in the Chest

Pain in the chest is a common symptom, but its cause is often obscure. Localized intercostal pain and tenderness may be the principal complaints, which can usually be ameliorated by local radiant heat. The pains are often transient, disappearing in a few weeks or months whatever the treatment. Pleural friction is a fairly frequent physical sign but is often unassociated with pain. However, when persistent pain is also present local injury, such as a cough fracture of the rib, may be suspected. A more central pain or feeling of constriction may arise from cardiac ischaemia or possibly pulmonary hypertension, both of which are common in men over the age of 55 with pneumoconiosis. Amyl-nitrite may be of therapeutic and diagnostic value. A marked coincidental increase of pain and breathlessness may be caused by a partial pneumothorax, which may be very difficult to diagnose without a chest film because of the extensive fibrosis and emphysema already present. Reassurance, and an explanation only, may cure the pain of a young man who has recently been told he has pneumoconiosis.

Breathing and General Exercises

During convalescence from an episode of chest infection general and breathing exercises are of help in re-establishing confidence by demonstrating to the man that he is capable of more activity than he supposed. To men who have lived an over-restricted existence since the diagnosis of their condition, exercises are of real benefit in getting back to a more normal life. Objective physiological evidence of improvement by breathing exercises is difficult to detect in pneumoconiosis, but many men claim improvement. Success depends more upon the enthusiasm and skill of the physiotherapist than in the particular set of exercises used.

Complications

Tuberculosis

Men with complicated pneumoconiosis who develop a positive sputum usually react poorly to chemotherapy and rarely survive more than two years (Kilpatrick, Heppleston, and Fletcher, 1954). As the lesions are almost always bilateral and extensive, surgery is of very limited use. It is possible that with initial treatment with streptomycin and P.A.S., followed by intermittent therapy over many years with P.A.S. and isoniazid, the outlook may be better. Young men with advancing complicated pneumoconiosis but a persistently negative sputum are a very difficult therapeutic problem. There is little evidence that antituberculous chemotherapy has any effect (Miall *et al.*, 1954), but long-term therapy over a number of years with isoniazid and P.A.S. while allowing them to continue working seems at present the most logical procedure. There are really no pointers to suggest that these men benefit in health by enforced idleness if they wish to work. As a protection to others, regular sputum examination is desirable.

Cor Pulmonale

In the terminal stages of complicated pneumoconiosis cor pulmonale is common and is often precipitated by an attack of chest infection. Rest in bed, an equable temperature, and large doses of antibiotics will often produce a dramatic improvement in the course of a few days. Mercurial diuretics, digitalis, and a salt-poor diet are beneficial, particularly where there is much oedema. In cases with a marked cyanosis and a very low urine output, aminophylline and oxygen have a useful potentiating effect on the mercurial diuretics.

After a period in bed and when their cardiac failure has been controlled, we encourage patients to be up and about as much as possible. There is usually greater risk of their becoming unnecessarily bedridden than of overexerting themselves.

Oxygen therapy has considerable use in this condition. Men with very severe and limited respiratory reserve get benefit both by relief of the cyanosis and by reduction of pulmonary ventilation. In our experience of these cases oxygen therapy rarely causes sufficient carbon dioxide retention to produce narcosis, so that it can usually be given without risk. Only in very severe and usually terminal attacks of cor pulmonale may it be necessary to use oxygen with caution. Some of the most disabled men also gain benefit from oxygen when up and about. The marked increase in their exercise ability while breathing oxygen suggests that a portable oxygen set might be of real value to them. For the present they can obtain the ordinary oxygen cylinder and mask for use in their homes under the

National Health Service. By taking oxygen after temporary exertion beyond their real capacity, such as going upstairs, they can shorten the period of acute respiratory distress. The cylinder is also useful for operating the nebulizer for the relief of bronchospasm.

Summary

Coal-workers' pneumoconiosis has two forms: simple pneumoconiosis, which is rarely a cause of severe disability except in elderly men; and complicated pneumoconiosis, which may cause severe disability after the age of about 35 and is a modified form of tuberculosis.

Under the present regulations men with either form are eligible for compensation. The number of new cases being certified annually in areas other than South Wales is increasing. The benefit paid is determined by the severity of disability and not by the degree of abnormality of the chest film. Miners receiving compensation may continue to work underground under dust-approved conditions if they wish.

Advice on the nature of the disease, compensation, and re-employment is of special importance in the management of these cases, as misunderstandings are apt to arise. These are discussed in some detail. There is need for more exchange of information between the doctors with whom a miner with pneumoconiosis is likely to consult.

Treatment of the acute pulmonary infections, bronchospasm, and cor pulmonale, and some of the principal symptoms in these cases, is briefly described.

We wish to express our thanks to Dr. J. C. McVittie, of the Ministry of Pensions and National Insurance, for help in preparing the section on compensation. We are grateful to Dr. J. M. Rogan, of the National Coal Board, and to our colleagues in the Pneumoconiosis Research Unit for their helpful criticisms.

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In his annual report for 1954 Dr. J. F. WARIN, the principal school medical officer of the City of Oxford, describes the steps that are being taken to prevent food-poisoning at school canteens. About 200 people are employed in the school canteens in Oxford, and a full medical examination and a chest radiograph have been a condition of employment for the administrative staff for some time. There is a higher labour turn-over among the manual workers in the canteens, and before they are employed they are asked detailed questions about any intestinal illnesses they may have had in the past. If there are reasons for doubts about a prospective employee's freedom from transmissible disease, then a full medical examination is arranged and blood and stool specimens are sent to the laboratory. Manual workers have a chest radiograph as a condition of employment. Posters illustrating the prevention of food-poisoning are on display in the school canteens, and it is intended that members of the chief sanitary inspector's staff will give talks to canteen workers on this important subject. When selected groups of the population in Oxford were offered examination at the miniature camera unit last summer canteen workers were included. The response to this offer was 100%. No case of active tuberculosis was detected.

HAEMATEMESIS

WITH SPECIAL REFERENCE TO PEPTIC ULCER

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Haematemesis (including melaena) is one of the common emergencies met with in hospital practice. The most usual cause of the condition is chronic peptic ulcer, which is on the increase. At the present time the population is becoming increasingly loaded with middle-aged and elderly people, who are both more liable to suffer from chronic peptic ulcer and less able to survive blood loss than are young adults. For these reasons, the methods used in treatment must be kept under continuous review. We have therefore examined the experience of the Radcliffe Infirmary during a recent five-year period (1948–52 inclusive) and compared it with the findings of a similar study made for the previous decade (1938–47) by Lewin and Truelove (1949).

Data

The sources of data of this study are the in-patient notes of the Radcliffe Infirmary, which is the only general hospital taking in emergencies from the City of Oxford and a considerable rural area surrounding it. Hence the patients can reasonably be regarded as an unbiased sample. Case notes of all patients (other than children) presenting as emergencies because of haematemesis or melaena during the five-year period 1948–52 have been examined. Trivial cases in which there was no evidence of serious bleeding have been excluded.

In considering the fatal cases we have adopted the criteria of Avery Jones (1952) in excluding only those deaths due to unrelated diseases or to elective operation after recovery from the bleeding. We have included all other cases with serious complications, among them (1) patients who have haematemesis or melaena following a perforated peptic ulcer, a group excluded by Avery Jones (1947) because of their special nature; and (2) patients who were already in hospital because of a serious disease which terminated in severe gastrointestinal bleeding, sometimes diagnosed only at necropsy.

Results

During the five-year period of 1948–52 there were 540 emergency cases of haematemesis and melaena, compared with 305 during the previous ten years. During the five years under consideration the annual rate of admission for haematemesis and melaena increased steadily from 87 in 1948 to 142 in 1952, a change related to the increasing frequency of peptic ulcer. The cause of the bleeding was classified under the following headings: (1) chronic peptic ulcer (377), (2) acute peptic ulcer (84), (3) oesophageal varices (23), (4) carcinoma of the stomach (20), and (5) other causes (36). The criteria used were the same as those used previously by Lewin and Truelove (1949).

The miscellaneous collection of cases which we have grouped together under "other causes" were as follows: hereditary telangiectasia, 5 (4 admissions were of one patient): hiatus hernia, 5; unknown, 26. Of the unknown group, there was evidence later of a gastric or duodenal ulcer

in nine of the patients. In none of the others was any later diagnosis made to suggest the cause of the bleeding.

The fatality rate of the present series shows a sharp decline from that of the previous ten years. For the total series, the fatality rate has dropped from 19.0% to 8.3%. For the chronic ulcer group, which is the biggest and most homogeneous single group, the fatality rate fell from 18.8% to 5.6%. In both the earlier and the present series a sharp increase in fatality occurred when the age of the patient exceeded 50 years; indeed, the pattern of fatality in relation to age is similar in the two series except that it is much lower at all age groups in the last five years. These findings are set out in detail in Tables I and II and Figs. 1 and 2.

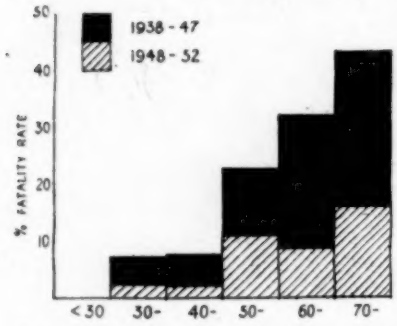

FIG. 1.—Whole series. Fatality rate by age groups.

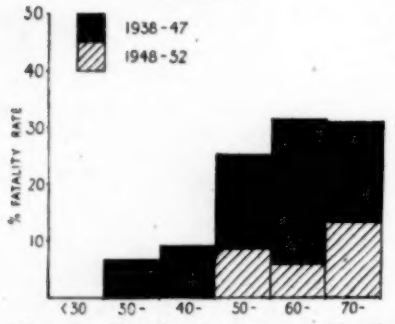

FIG. 2.—Chronic ulcer group. Fatality rate by age groups.

In view of this effect of age on the fatality rate, it is important to record that the later series contains a bigger proportion of patients over 50 than the earlier, as shown in Table III. The lowered fatality rate is therefore not due to any favourable change in the age composition of the series. On the contrary, the circumstance that approximately two-thirds of all the patients were over the age of 50 is a striking feature of the present group.

TABLE I.—*Fatality Rate from Haematemesis by Age. Total Series*

Age Group	1938–47			1948–52		
	No. of Cases	Deaths	Fatality Rate	No. of Cases	Deaths	Fatality Rate
Under 30 ..	26	0	0%	30	0	0%
30–39	42	3	7·1%	45	1	2·2%
40–49	67	5	7·5%	99	2	2·0%
50–59	84	19	22·6%	137	16	11·7%
60–69	56	18	32·1%	141	12	8·5%
Over 70	30	13	43·3%	88	14	15·9%
Total ..	305	58	19·0%	540	45	8·3%

TABLE II.—*Fatality Rate from Haematemesis by Age. Chronic Ulcer Groups*

Age Group	1938–47			1948–52		
	No. of Cases	Deaths	Fatality Rate	No. of Cases	Deaths	Fatality Rate
Under 30 ..	18	0	0%	17	0	0%
30–39	30	2	6·6%	35	0	0%
40–49	44	4	9·1%	83	0	0%
50–59	59	15	25·4%	94	8	8·5%
60–69	41	13	31·7%	88	5	5·7%
Over 70	16	5	31·2%	60	8	13·3%
Total ..	208	39	18·8%	377	21	5·6%

TABLE III.—*Percentage of Patients Over the Age of 50 in the Two Consecutive Series*

Series	Whole Series	All Peptic Ulcers	Chronic Ulcers
I (1938–47) ..	55·7	54·4	55·8
II (1948–52) ..	67·8	65·3	64·2

Effect of Sex

Table IV shows the chronic ulcer group broken down into two main age groups and by sex. It will be seen that the difference in fatality in the two sexes is small, although women may be somewhat less prone to die. Another feature of interest is the different proportion of women in the two age groups. It will be seen that below 50 the male : female ratio is about 4 : 1, whereas above 50 it is less than 2 : 1. This is presumably related to the liability of women to develop chronic peptic ulcers after the menopause, although they are relatively free from them before. During these last five years the proportion of women in the over-50 age group is noticeably higher than it was in the earlier series, although the proportion of women in the under-50 age group is the same as it was before.

TABLE IV.—*Fatality Rate by Age and Sex. Chronic Ulcer Group*

Age Group	Men		Women	
	No. of Patients	Deaths	No. of Patients	Deaths
Under 50	107	0 (0·0%)	28	0 (0·0%)
Over 50	155	16 (10·3%)	87	5 (5·7%)
	262	16 (6·1%)	115	5 (4·3%)

Recurrent Bleeding

The most important single variable other than age which affects prognosis is the liability of a patient to continue to bleed freely or to have recurrent bleeding after admission to hospital, as has been particularly well demonstrated by Avery Jones. In this connexion it is worth mentioning that the proportion of patients who exhibited recurrent bleeding was closely similar in the two Radcliffe Infirmary series. In each series about one-third of the patients had a recurrent haematemesis or other evidence of continued bleeding after admission to hospital.

It is sometimes assumed that the longer an ulcer has existed the more likely it is to give rise to recurrent bleeding. In this series the length of ulcer history had no influence on liability to recurrent bleeding. In 101 patients with a history of chronic ulcer of less than five years the incidence of recurrent bleeding was 35%, while in 207 patients with a history of more than ten years the incidence was 32%.

Likewise, neither a history of previous haematemesis nor the age of the patient has any bearing on the liability to recurrent bleeding, as shown in Tables V and VI, and as previously found by Lewin and Truelove (1949).

TABLE V.—*Incidence of Recurrent Bleeding in Patients With and Without a History of Previous Haematemesis. Chronic Ulcer Group*

	No. of Patients	No. with Recurrent Bleeding
With previous bleeding ..	108	37 (34·2%)
No " " ..	256	84 (32·8%)

TABLE VI.—*Incidence of Recurrent Bleeding in Two Main Age Groups. Chronic Ulcer Group*

Age Group	No. of Patients	No. with Recurrent Bleeding
Under 50	135	41 (30·4%)
Over 50	229	80 (34·9%)

Treatment

It has been the practice in the Radcliffe Infirmary for patients with haematemesis to be admitted under the care of a physician and for initial treatment to be medical rather than surgical. About 7 out of every 10 patients in the peptic ulcer group made an uneventful recovery without evidence of recurrent bleeding on orthodox medical treatment—namely, rest, a bland diet, and blood transfusion when indicated. The proportion of patients who made an uneventful recovery on medical treatment is a little higher in

TABLE VII.—*Proportion of Patients Making an Uneventful Recovery on Medical Treatment. Peptic Ulcer Group*

Age Group	No. of Patients	No. Making Uneventful Recovery
Under 50	160	117 (73·1%)
Over 50	301	196 (65·2%)

the younger than in the older age groups, as shown in Table VII, but the difference is not marked.

Whereas in the previous ten years the part played by surgery was negligible, during the recent five years emergency surgery has often been used. Although there has been no rigid uniformity of policy among the various physicians and surgeons concerned, the usual course of action has been to employ medical treatment and to resort to surgery when there has been evidence of continued or recurrent bleeding and the presence of a peptic ulcer has been known or suspected. In all, 76 out of the 461 patients with chronic or acute peptic ulcer were treated by emergency partial gastrectomy—that is, 1 in 6. We have defined an emergency partial gastrectomy in this context as an operation done for the immediate arrest of dangerous bleeding. A partial gastrectomy carried out after bleeding had stopped for more than 24 hours but less than a week has been classed as an early elective operation; there were 38 such operations, or 1 in 12.

Following the 76 emergency operations there were 7 deaths (9.2%). None of these occurred in the 20 patients who were aged less than 50 years. Hence there were 7 deaths (12.5%) among the 56 patients over 50 years old. The operative fatality among patients over 50 was therefore considerable, but we must remember that the patients selected for emergency operation were those who would have had a high fatality rate with medical treatment, almost certainly much higher than occurred with surgery.

Of the 76 emergency operations, 66 were performed on patients in the chronic ulcer group, with 6 deaths (9.1%). The remaining 10 emergency operations were carried out for acute ulcer, and there was 1 death. Thus there is no obvious difference between the results of surgery in the acute and chronic ulcer groups.

It has already been noted that 20 of the emergency operations were carried out on patients under the age of 50. At the other end of the age scale, 14 emergency operations were carried out on patients over the age of 70 with 2 deaths, a fatality rate not appreciably different from the group between 50 and 70, as will be seen from Table VIII.

TABLE VIII.—*Operative Fatality Rate in Relation to Age*

Age Group	No. of Cases	No. of Deaths
Under 50	20	0
50–69	41	5 (12·2%)
Over 70	15	2 (13·3%)

It is of some interest that the only emergency operation done in the chronic ulcer group has been partial gastrectomy with excision of the ulcer. Before the start of the present series in 1948 other operations, such as ligation of vessels from within or without the stomach, cauterization, or oversewing of the ulcer had been practised. This change has been due to the individual choice of each surgeon, since uniform lines of treatment for the whole hospital by formal agreement of the staff do not exist at the Radcliffe Infirmary. The completeness of the change is therefore all the more striking.

Deaths

The total number of deaths in the chronic peptic ulcer group (377 admissions) was 21, but this includes 11 deaths which we regard as inevitable because there was some other grave disease in addition to the haematemesis. Many authors exclude such cases from their series. If we had done the same the fatality rate in this group of patients would be 2.7% instead of the figure of 5.6% referred to in an earlier section. Brief details of the deaths are as follows:

Preventable (10 deaths).—Those deaths which occurred among patients without grave, unrelated, complicating diseases. Four of these patients died without surgical operation, and six died after emergency partial gastrectomy.

Inevitable (11 deaths).—Those deaths occurring in patients who suffered from a grave illness unrelated to the ulcer. In some of these cases the occurrence of massive bleeding was found only at necropsy. The nature of their complicating illnesses was as follows:

(1) Man aged 56. Admitted with coronary thrombosis. Arterial embolism of leg. Amputation and re-amputation. Collapsed and died suddenly. At necropsy, massive bleeding from a large benign gastric ulcer was found.

(2) Man aged 59. Admitted with acute appendicitis and general peritonitis. Developed severe recurrent haematemesis and was too ill for operation.

(3) Man aged 59. Admitted with haematemesis from chronic duodenal ulcer. Suffered from severe chronic tuberculous empyema with multiple sinuses and destruction of right lung.

(4) Woman aged 57. A severe chronic bronchitic admitted with bronchopneumonia and cardiac failure. Developed massive haematemesis from duodenal ulcer.

(5) Man aged 65. Admitted with carcinoma of gall-bladder with multiple metastases. Died suddenly. Necropsy showed two gastric ulcers and a duodenal ulcer with a large amount of fresh blood in stomach and small intestine.

(6) Man aged 68. Had previously had removal of carcinoma of rectum with local metastases. Was ill at home with diagnosis of carcinomatosis until admitted moribund. Died in three hours. Necropsy showed inhaled vomit, gross pyloric stenosis, and a duodenal ulcer which had bled.

(7) Man aged 70. Admitted for prostatectomy. On twelfth day had massive haematemesis and died in three hours in spite of transfusion. Necropsy showed large gastric ulcer which had eroded an artery.

(8) Man aged 75. Admitted with obstructive jaundice due to gallstones. Had suffered from intermittent attacks of jaundice with rigors for four years. Had haematemesis and quickly died. Necropsy showed two duodenal ulcers with fresh blood in intestine, cholelithiasis, and fibrosis of liver.

(9) Man aged 75. Admitted in coma due to metastases from carcinoma of the prostate which had been previously removed. Had recurrent haematemesis and died in four days. Necropsy showed bleeding chronic gastric ulcer and lobar pneumonia in addition to carcinomatosis.

(10) Man aged 81. Had a six-year history of hypertensive cardiac failure with auricular fibrillation. Admitted with haematemesis. Was in heart failure on admission. Had recurrent haematemeses and died on eleventh day. Necropsy showed two large chronic gastric ulcers, one of which had eroded an artery, and an enormous heart with generalized atheroma.

(11) Woman aged 71. Admitted with acute intestinal obstruction due to carcinoma of ascending colon. Following a hemicolectomy, had severe recurrent haematemeses and died. Necropsy showed four chronic gastric ulcers.

Discussion

In the present series peptic ulcer was by far the most common cause of haematemesis, accounting for 85.4% of the admissions—that is, about 17 out of every 20. The next most common single cause was bleeding from oesophageal varices due to portal hypertension, which accounted for 4.3% of admissions. In almost all these latter patients the diagnosis was apparent on admission; in fact, most of them were already under medical supervision for the underlying cause of their portal hypertension, and splenomegaly was almost invariable. Carcinoma of the stomach is also a fairly common cause of haematemesis, accounting for 3.7% of admissions; if the diagnosis is not obvious it may be confused with simple peptic ulcer, but the initial treatment is the same. The haemorrhagic disorders usually present other signs of the underlying disorder. Other causes are not common but are extremely diverse, and in some cases the diagnosis remains unknown. In such circumstances it is probably best to assume that the bleeding is from a peptic

ulcer, because the odds are in favour of this possibility even in the absence of a history of dyspepsia. Moreover, if the case is managed along lines suitable for peptic ulcer, little harm will usually be done if the source of bleeding proves to be some other lesion.

There is still no general agreement on the best course of treatment for haematemesis in patients with known or suspected peptic ulcer. Three schools of thought exist (Tanner, 1951; Avery Jones, 1952). The "conservative" school believes in treatment on purely medical lines with sedation, bland diet, correction of dehydration, and blood transfusion. Surgery is either not used or resorted to as a final desperate measure. Another group practises "selective surgery" (Tanner, 1950), carrying out emergency partial gastrectomy in those patients with peptic ulcer who are known to be poor risks with medical treatment. These are mostly patients over 50 with continued or recurrent bleeding after admission to hospital, as has been convincingly demonstrated by Avery Jones (1947). The third school of thought, often associated with the names of Finsterer and of Gordon-Taylor (1937), believes in "early surgery as the treatment of choice" (Finsterer, 1939) in all patients in whom there is a previous history suggestive of chronic peptic ulcer and in the absence of serious unrelated disease.

In connexion with these various approaches to treatment, it is of interest that the fatality rate from haematemesis in patients admitted to the Radcliffe Infirmary was much lower during the period covered by the present series (1948–52) than it was during the preceding decade. This fall in fatality has occurred in spite of a bigger proportion of elderly patients and with as big a proportion showing recurrent bleeding after admission. A number of improvements in medical care have doubtless assisted in this change, particularly improvements in blood transfusion and the development of antibiotics. However, we are satisfied that a major cause of the improvement has been the more frequent resort to surgery.

In general, the plan followed has been that of "selective surgery" as defined above, although a number of the patients who fulfilled the criteria for surgery were treated medically throughout, particularly at the beginning of the period under review. However, the age of the patient has not been regarded as an important factor in deciding against surgery. Twenty patients aged less than 50 were treated with emergency partial gastrectomy without a single fatality. It is often taught that emergency operation is inadvisable in patients aged over 70, but in this series there were 15 emergency operations on such patients, with only 2 deaths. The factor of age in deciding on operation is of importance only when there is genuine doubt whether operation is indicated. In such circumstances one can afford to await events if the patient is young, as he will probably survive a further haemorrhage, but if he is over 50 it is probably wiser to decide in favour of emergency surgery without delay.

The present series yields no direct evidence on the value of "early surgery as the treatment of choice" in all patients with known or suspected peptic ulcer. However, it may be relevant that 7 out of every 10 patients in the peptic ulcer group made an uneventful recovery on medical treatment. While early surgery might improve the expectation of the remaining 3 in every 10 who are fated to have recurrent bleeding after admission, it would expose all the peptic ulcer patients to a major operation at a time when they may not be in the best condition for it and when the majority would recover uneventfully from their present haemorrhage without surgery. However, the issue is not entirely straightforward, for many of the patients who are treated medically will need surgical treatment later or may have a further complication of the ulcer, so that a correct comparison of the two methods ("selective surgery" and "early surgery as the method of choice") should include a follow-up study. Even in the brief time between the admission of the patients of this series and the end of 1953 53 of the 258 patients with chronic ulcer surviving their haematemesis without emergency operation have required surgical treatment in the Radcliffe Infirmary, in some cases because of emergencies due to the ulcer, such as another major bleed or a perforation.

Summary

During the period 1948–52 540 cases of haematemesis or melaena presented as emergencies in the Radcliffe Infirmary. The results of treatment have been compared with those obtained in the previous decade.

Peptic ulcer was the most common cause of bleeding, accounting for 17 out of every 20.

The overall fatality rate was 8.3%. For 377 patients with good evidence of chronic peptic ulcer the rate was 5.6%.

Among the chronic ulcer group, about 1 in 3 suffered from continued or recurrent bleeding after admission to hospital. The chance of recurrent bleeding occurring while still in hospital is not appreciably influenced by age, length of ulcer history, or a past history of haematemesis.

Of the peptic ulcer group, 7 out of every 10 made an uneventful recovery from bleeding on medical treatment. One in every 6 had an emergency partial gastrectomy for bleeding, with a fatality rate of 9.2%.

The scope of emergency surgery in the treatment of haematemesis has been discussed. Nine out of every 10 cases of haematemesis are likely to be due to peptic ulcer or gastric carcinoma, and surgery may be the wisest treatment in any of these who show evidence of continued or recurrent bleeding.

We wish to thank the physicians and surgeons of the Radcliffe Infirmary for permission to make this study. We are also grateful to Miss P. Coombes, the records officer, and Miss B. Merry and Mrs. M. Eastway of her staff, for their assistance.

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"Maggots taken from a dead body are sometimes received with a request for identification and an opinion on their age, in case this may assist in fixing the time of death," writes J. A. Reid in Bulletin No. 7 from the Institute of Medical Research, Federation of Malaya. He explains that it is difficult to deduce precisely from maggots the time of the host's death because of the rapid decay in the Malayan climate. The presence of full-grown maggots of the flesh-fly suggests that death occurred at least three days before, of blow-fly maggots that it occurred at least six days before. But the victim may have had a fly-blown wound before death. The sequence in the processes of decay and the insects associated with them, the lapse of time between death and the laying of the first eggs, and the duration of the various larval stages of the different flies have not been fully worked out in Malaya; consequently the time of death cannot be very accurately gauged. In 1950, however, Dr. H. M. Nevin, a pathologist, examined some young maggots collected from the body of a woman shot by bandits in Penang, and Mr. Reid's identification of them as second-stage larvae of the blow-fly between 16 and 24 hours old agreed with police evidence that the woman had been killed less than 24 hours earlier. For forensic investigation, half the maggots collected from the body should be killed in boiling water and preserved in 70–80% alcohol to show their age at the time of collection, and the other half should be sent alive so that by breeding to maturity the adults may be used to check identification.

A CASE OF SYMPTOMATIC HAEMOLYTIC ANAEMIA IN PREGNANCY

BY

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AND

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This report describes a case of symptomatic haemolytic anaemia occurring during a young woman's first two pregnancies. She gave no previous history of jaundice or anaemia. The haemolytic process on both occasions followed the onset of gestation and ceased spontaneously after delivery.

In the older literature megaloblastic anaemia of pregnancy was often confused with haemolytic anaemia and pernicious anaemia, so the records are unreliable as regards the incidence of the disease. Within the last decade we could find few papers in the English literature specifically devoted to this complication of pregnancy. In our hospital the case described below was the only one which had occurred in over 12,000 pregnancies seen during the past five years. It would therefore appear to be rare.

First Pregnancy

A married woman aged 29 was first seen by one of us (G. A. C.) at St. Luke's Maternity Hospital in October, 1949. She was then in the last trimester of her first pregnancy. She gave a history of being quite well throughout that pregnancy until shortly before admission, when she felt sick and vomited, subsequent to which she became slightly jaundiced. She denied ever having been jaundiced or anaemic before in her life. There was no family history of haemolytic anaemia; her two sisters, both married, had had normal pregnancies. On examination the patient was found to be 32 weeks pregnant. She was clearly anaemic and jaundiced. Her liver and spleen were not enlarged and her body temperature was normal. No other clinical abnormality was found.

Investigations.—Haemoglobin, 8 g. per 100 ml.; red cells, 1,600,000 per c.mm.; reticulocytes, 25%. A marked polychromasia and scanty normoblasts were present in the peripheral film but no microspherocytes were seen. The red-cell-fragility test by the method of Creed gave a normal result. The total white cell count was 7,000 per c.mm., the differential count being normal. Platelets numbered 210,000 per c.mm. The sternal marrow showed a marked normoblastic hyperplasia. Blood chemistry: van den Bergh reaction—direct test negative, indirect test positive; serum bilirubin 3.2 mg. per 100 ml. Urine: bilirubin absent; haemoglobin absent; urobilinogen strongly positive.

A diagnosis of haemolytic anaemia was made. The patient was treated with folic acid and liver preparations, and was given blood transfusions, but did not respond to any of these. In fact, blood transfusion merely seemed to cause increased haemolysis. On December 14, after a surgical induction of labour, the patient delivered herself of a healthy female infant. Two weeks later her haemoglobin had risen for the first time since her admission to hospital, to 10.4 g. per 100 ml., and subsequently the haemolytic process rapidly ceased. The patient and her baby were seen three months after delivery and were then in good health. Laboratory examinations failed to give any evidence of haemolytic anaemia in either the mother or her baby. The mother's haemoglobin was then 15.6 g. per 100 ml.

Second Pregnancy

Clinical Features

The patient came under our care for the second time on December 8, 1952, being again pregnant. Her expected date of delivery was April 2, 1953. On inquiry she said she had been perfectly well since her last pregnancy, and had remained so during the early weeks of this one. In the two weeks prior to attending the antenatal clinic she had again noticed a slight jaundice accompanied by excessive tiredness.

Examination revealed a well-nourished woman aged 32. There was a slight icterus of the sclera and skin. No oedema was present. Her uterine enlargement corresponded to a 26-weeks pregnancy. Physical examination of her cardiovascular, central nervous, and respiratory systems showed no abnormality. Neither the spleen nor the liver was palpably enlarged. Her body temperature was normal.

Laboratory investigations, details of which are given below, showed that she had a recurrence of the haemolytic anaemia experienced during her first pregnancy. It was decided to allow the pregnancy to continue to term if her condition permitted, supporting her when necessary with blood transfusions.

Her progress continued fairly satisfactorily until March 12, when the maturity of her pregnancy was 37 weeks. On that date her haemoglobin level had fallen to 4 g. per 100 ml. Two pints (1,140 ml.) of whole blood was administered. This raised the haemoglobin level to 7.3 g. per 100 ml., but on March 14 it had fallen to 5.3 g. per 100 ml., and a cold agglutinin had appeared in her blood that temporarily rendered cross-matching difficult. As soon as this difficulty had been overcome a surgical induction of labour was performed. This was followed by the delivery of a normal live female child on March 15. The blood loss at delivery was normal.

Following delivery the haemolytic process persisted without apparent abatement for four weeks, and then gradually ceased. By May 20 it had stopped completely, so far as could be determined by laboratory tests.

The patient's clinical condition throughout the second pregnancy was much worse than during the first. The severity of the haemolytic process was evidently increasing with the parity. In view of this, sterilization was advised. For this purpose laparotomy was performed in the puerperium, when the patient was still showing some evidence of increased red-cell destruction.

At operation the abdominal organs, including the liver and the spleen, appeared normal. One ovary showed a number of small cysts, the other appeared atrophic. The genital organs were otherwise normal. Biopsy material was obtained from both ovaries, and a small inguinal lymph node was removed. Since the patient's discharge both she and her two children have been examined from time to time for the presence of haemolytic anaemia with negative results. The last examination of the patient, six months after delivery, showed haemoglobin 15 g. per 100 ml., reticulocytes less than 1%, serum bilirubin 0.8 mg. per 100 ml., and faecal urobilinogen 130 Ehrlich units per 100 g. of faeces. She was symptom-free and in good health.

Laboratory Investigations

Haemoglobin and Red Cells.—At her first attendance the patient's haemoglobin was 7.3 g. per 100 ml. Examination of the stained film showed a moderate degree of polychromasia. Normoblasts constituted 2% of the total nucleated cells present. No microspherocytes were seen, nor were any found in subsequent blood examinations. On February 12, 1953, the mean corpuscular volume was 114 cubic μ and the mean corpuscular haemoglobin concentration 30%. Reticulocyte counts when the haemolytic process was at its height varied from 20 to 32% of the total red-cell count, and normoblasts were found in every stained film examined during this period. The behaviour of the blood counts is given in Table I. The haemoglobin was estimated by the alkaline haematin method of King (1946).

TABLE I.—*Chronological Record of Laboratory Studies*

Date	R.B.C. mil./ c.mm.	Hb g./ 100 ml.	Reticulocytes %	Leucocytes per c.mm.	Platelets per c.mm.	Serum Bilirubin mg./ 100 ml.	Faecal Urobilinogen Ehrlich Units/ 100 g.
8/12/52	2·4	7·3	21	7,600	196,000	2·2	800
16/12/52	Transfusion 2 pints whole blood						
18/12/52		10·0		8,300		2·1	
23/12/53		9·9		5,100	185,000	1·9	1,200
14/1/53		9·6	30			1·7	1,980
12/2/53	1·4	4·5	32	9,800	250,000		
13/2/53	Transfusion 3 pints whole blood						
17/2/53	1·32	4·4	31	10,200	240,000		
2/3/53	1·35	4·4	30	10,300	180,000	2·0	
12/3/53	1·2	4·0	22	5,800			
	Transfusion 2 pints whole blood						
13/3/53		7·4	24	6,700			
14/3/53		5·3		8,100	190,000		
15/3/53	Patient delivered. Blood loss normal						
16/3/53	1·7	5·1	11	9,000	200,000	1·4	
25/3/53	1·6	5·3	25	9,200	251,000	1·3	2,650
30/3/53	Transfusion 2 pints whole blood						
1/4/53	2·6	8·9	27	8,900	196,000	1·3	2,700
8/4/53	2·64	8·8	28	10,100		1·6	
10/4/53	Transfusion 2 pints whole blood						
15/4/53	3·91	10·9	16	9,800	194,000	1·1	980
1/5/53	3·8	12·5	8	7,600	210,000	1·2	670
10/5/53	4·02	13·0	2	10,100		0·9	340
20/5/53	5·03	14·5	0·5	6,700	220,000	0·6	140

Red-Cell Fragility.—The patient's red cells were examined, using the combined fragility test of Varadi (1951), on December 23, 1952, and February 24 and May 30, 1953, and no increase in fragility was demonstrated.

Faecal Urobilinogen.—The semi-quantitative method of Watson as described by Wintrobe (1951) was used. The results are summarized in Table I. The upper limit of normal by this method is 350 Ehrlich units per 100 g. of faeces.

Blood Chemistry.—No abnormality was found on estimating the serum proteins and blood urea. Schumm's test for methaemalbumin was negative. Haemoglobinaemia was never demonstrated. The direct van den Bergh reaction was negative, and the indirect strongly positive. Serum bilirubin estimations varied between 1.7 and 2.2 mg. per 100 ml. during pregnancy.

Fractional gastric analysis showed the presence of free hydrochloric acid.

Sternal Marrow.—This was examined on February 12. The myelogram (Table II) showed a richly cellular marrow. There was a marked normoblastic hyperplasia. Apart from the reduction in relative proportions the myeloid series appeared normal.

TABLE II.—*The Myelogram*

Proerythroblasts	4·0%
Early normoblasts	18·0%
Late and intermediate normoblasts	43·0%
Myeloblasts	0·5%
Premyelocytes	0·5%
Myelocytes	6·0%
Metamyelocytes	10·0%
Polymorphonuclear leucocytes	15·0%
Lymphocytes	1·0%
Normoblasts in mitosis	2·0%
Megakaryocytes	Present
Myeloid/erythroid ratio	0·3: 1

Leucocytes.—The total white cell counts varied from 5,000 to 10,300 per c.mm. Scanty myelocytes (under 1%) were present from-time to time during pregnancy, otherwise the differential count showed no abnormality.

Platelet counts varied between 180,000 and 300,000 per c.mm.

Urine.—Urobilinogen was present in the urine in increased amounts during pregnancy. Its presence was demonstrated by the techniques described by Wintrobe (1951). Tests for haemoglobin, bilirubin, and haemosiderin were negative.

Coombs Test.—The direct and indirect tests were invariably negative during pregnancy and following the patient's recovery. The technique used was that described by Dacie (1950).

Circulating Haemolysins.—The patient's blood was examined, using the presumptive tests described by Wintrobe (1951), for the presence of cold and warm haemolysins on February 12, March 27, and April 20. They were not demonstrated.

In Vitro Erythrophagocytosis.—The method described by Zinkham and Diamond (1952) was used. The index was less than 0.1%—a normal result.

Cold Agglutinins.—On March 13, two days before delivery, a cold agglutinin in low titre (1/32) was noticed in the patient's blood. Its presence had not been detected previously and it disappeared within five days of its first appearance. It may have been due to the transfusion given on March 12.

Serology.—The patient was Group O, Rh positive; no atypical antibodies were present in her serum. The Kahn test was negative.

Baby's Cord Blood.—Blood Group A, Rh positive. No agglutinins active against the mother's cells in saline or albumin or by the Coombs technique were detected in the cord serum. The haemoglobin was 19.3 g. per 100 ml. No evidence of a haemolytic anaemia was found at birth or in subsequent examinations of the baby.

Histology of Biopsy Material.—One ovary showed the presence of multiple small follicular cysts; in the other a corpus albicans was present but no active follicles were seen. The inguinal lymph node showed fibrous scarring due to past attacks of lymphadenitis.

Discussion

O'Grady *et al.* (1953), in a short review of haemolytic anaemia in pregnancy, state: "Although pregnancy does not cause haemolytic anaemia it may be a precipitating factor." In our case, however, the intimate association of the anaemia with the patient's two pregnancies and its cessation following delivery suggest that gestation plays an important part in its causation. The mechanism of the increased red-cell destruction is obscure. The failure to demonstrate either autoagglutinins or haemolysins in the circulating blood indicates that abnormal antibody formation is not a factor. This is in keeping with the findings in cases of symptomatic haemolytic disease due to other causes (Allibone and Collins, 1951). Lescher (1942), in a review of eight cases of haemolytic anaemia in pregnancy, states that there is no evidence of the development of a haemolysin in either the maternal or the foetal structures. He also notes that neither nutrition nor infection seems to play any part in the abnormal haemolysis.

Whitby and Britton (1950) regard the haemolytic anaemia occurring during pregnancy as similar to Lederer's anaemia. Our case differs from the usual description given of the latter condition in that it ran a less fulminating course and, apart from the symptoms due to the low haemoglobin concentration *per se*, there was no constitutional upset. It did not respond dramatically to blood transfusion. The haemolysis, moreover, was not accompanied by pyrexia or leucocytosis.

The failure of the spleen to enlarge and the fact that the process ceased completely after delivery, in the absence of splenectomy, indicates that this organ does not play any dominant part in the production of the disease. The possibility that this was a case of congenital acholuric jaundice can be dismissed in view of the absence of spherocytosis, the negative Varadi test, and the lack of a familial or personal history of such a disease. As the patient belonged to Group O, red-cell-survival studies were not attempted. The very transient rise produced in the haemoglobin concentration by transfusions (see Table I) suggests that the normal transfused cells were eliminated as fast as the patient's own cells. It is unlikely, therefore, that the process was due to any intrinsic effect induced by pregnancy in her red-cell structure.

In this case the haemolytic process seems to be due to overactivity of the normal mechanisms for the removal of red cells from the blood stream. The nature of such mechanisms is at present obscure. It is known, however, that they are influenced by the sex hormones. Hyperhaemolysis has been demonstrated in normal women during the latter part of the menstrual cycle (Ashby, 1921; Berlin, 1951). These authors, while admitting the obscurity of the nature of this hyperhaemolysis, conclude that it is due to hormone influences; Berlin also believes that the spleen plays no part in its production, as he found it to persist after splenectomy. Presumably, during a normal pregnancy the hyperhaemolysis is inhibited, to prevent the increased concentration of sex hormones following gestation from causing a haemolytic anaemia. In our case the inhibitory mechanisms would appear to have failed.

Summary

A case of symptomatic haemoiytic anaemia associated with pregnancy is described. The haemolytic process occurred during a young woman's first two pregnancies and ceased spontaneously on both occasions during the puerperium. Neither circulating haemolysins nor atypical agglutinins were demonstrated. The mechanism of the hyperhaemolysis was obscure. We suggest that it may be related to that occurring during the progestational phase of the normal menstrual cycle.

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ROSEOLA INFANTUM

13 CASES SEEN IN GENERAL PRACTICE

BY

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Very little has been published in Britain on this relatively common condition, also known as exanthem subitum or sixth disease. The *British Medical Journal* (1950) draws attention to this "common but little-known infectious disease of young children which has received too little attention in the past."

Nearly all the published accounts of the disease come from the U.S.A., where Zahorsky, of St. Louis, first described it as a clinical entity and gave it the descriptive name in 1910. Up to 1940 he had seen about 300 cases in private practice (Zahorsky, 1940). Cases have been reported from all over the world, including Brazil, Formosa (Itagaki, 1933), Canada, Germany (Fischhof, 1936), South Africa (Witkin, 1937), Sweden, and Australia (Jackson, 1949). In Britain, only Schlesinger (1937) refers to a few cases seen in London.

The purpose of this paper is to show that, despite the paucity of references to it in the journals and textbooks, it arises quite frequently in general practice.

Age Incidence.—The disease affects infants between the ages of 6 months and 2 years. The youngest in Clemens's (1945) series of 80 cases was 5 months old, but he quotes one 2 months old. My youngest patient was 4½ weeks old. Older children and adults have been involved in other series. The sexes are equally affected.

Aetiology.—Although the infective nature of the disease was accepted, proof was not established until Kempe *et al.* (1950) succeeded in transmitting the disease by injecting serum from an 18-months-old child in the pre-eruptive stage into a 6-months-old susceptible baby kept in isolation, who developed typical roseola infantum on the ninth day. In young apes these workers produced a fever without a rash after a similar period. While they consider the causal agent to be a virus, they have been unable to isolate it or to transmit it through any of the usual media. Hellström and Valquist (1951), at Upsala, have confirmed these findings in a larger series of 14 human cases.

Epidemiology.—Although most cases arise sporadically, epidemics have been reported, and the cases which I noted in my practice presented as a mild epidemic, although I can identify in recollection a number of sporadic cases over the years. American writers believe that it is endemic and almost universal in infancy, but that in favourable circumstances it appears in epidemic form. They find that the highest incidence is in the spring and to a less degree in the autumn.

Pathology.—No deaths have been reported. The blood changes seem to be important—they are a neutrophil leucopenia, appearing during the febrile stage and falling to a total white-cell count as low as 2,000 per c.mm. This process is reversed as soon as the rash appears, and the count returns to normal within a week. The incubation period is 5 to 15 days.

Clinical Course

The individual case presents on the following lines. A call is received to an infant who "has come out in a rash all over. He's been feverish for a few days, and I nearly sent for you yesterday, doctor. When I saw the rash to-day I thought it must be measles, but he seems better now." In fact, the child appears well apart from a rash in the form of discrete rose-coloured macules, most marked on the trunk but spreading on to the thighs and upper arms, up to the neck and often behind the ears. In severe rashes some coalescence may occur.

If the case is seen earlier the child has a fever extending over three to five days, the temperature rising to 101–102° F. (38.3–38.9° C.) or higher, with symptoms of inflammation and congestion of the nose and throat, and frequently of the tympanic membranes. He is restless, may refuse feeds, and is obviously unwell. Examination of the fauces shows redness of the tonsils and pharynx, and of one or both ear-drums. A cough may be present without signs in the chest. With the appearance of the rash the child rapidly improves, the catarrhal signs disappear, and normal lustre returns to the ear-drums. Posterior cervical and occipital lymph-node enlargement can nearly always be found: in my experience this is more obvious when the rash is severe, especially on the neck and behind the ears. The glands in the groins and armpits do not become palpable. All signs disappear in a day or two in most cases, but occasionally congestion of the nose or Eustachian tubes persists and frank otitis media may develop (as in one of the present series).

Clemens (1945), in a series of 80 cases, reports a pre-eruptive enanthem in 87%: this took the form of erythematous specks and streaks on the soft palate which preceded the typical exanthem by 48 hours and coincided with the period of maximum tubotympanitis and faucial congestion. I noted this in one case, but would be inclined to dismiss it as part of the general congestion of the mucous membrane of the palate.

Differential Diagnosis

In a clear-cut case the disease which is most like roseola infantum is rubella. In that condition the pyrexia and malaise coincide with the rash and are usually less pronounced. There is not the three to five days' pre-eruptive

fever and malaise, with a dramatic return to normality invariably found with roseola. In rubella the rash is usually marked on the face, as opposed to roseola infantum, in which the face escapes, apart from a few faint rosy macules on the forehead. The absence of cases of rubella among older children and adults suggests the correct diagnosis.

Scarlet fever may be suspected. The absence of circumoral pallor, strawberry tongue, tonsillar adenitis, and the rapid resolution of the rash in roseola infantum, together with the age incidence, will help to exclude it.

The prodromal rash of measles, or the early stage of the eruption with a post-auricular rash, may also be suggested. Again, this doubt is soon resolved by the absence of Koplik's spots and the course of the illness.

Since I have recognized the disease in practice I am certain that many rashes which were previously dismissed to the parents as "teething" or "stomach upset" or "drug rash" have in fact been roseola. The story of restlessness, fever, and sweating may suggest miliaria, but the rash is quite different. There are, too, the blood changes I have already mentioned.

Complications

Although most observers say that recovery is always complete, Zahorsky reports several cases of suppurative otitis media and rhinitis following the illness, and one case in the present series developed an acute catarrhal otitis media three days after defervescence.

Jackson (1949), in Australia, had two cases in which convulsions occurred in the feverish stage: no changes were found in the C.S.F., and he believes them to have been due to the pyrexia.

It has been suggested that deaths in convulsions may occur before the rash has had time to appear; this is obviously difficult to prove.

Details of Cases

Case	Age in Years	Sex	Date of Rash	Comments
1	3½	M	15/1/54	Cough and cold preceding; cleared rapidly afterwards. Post-auricular glands enlarged
2	10/12	M	23/1/54	Feverish preceding rash—normal afterwards. Lives in adjoining street to Case 1
3	10/12	F	23/1/54	Feverish preceding rash—normal afterwards
4	10/12	F	23/1/54	Typical roseola—had been to same Christmas party as Case 3, on 16/1/54
5	11/12	M	27/1/54	Had tonsillitis 10 days previously—apparent recurrence 3–4 days before rash, but subsided with rash
6	4½/52	F	27/1/54	Adopted sister of Case 1. Cough and nasal catarrh. ? Pain on swallowing; fauces red. Better after eruption
7	11/12	F	4/2/54	Fever preceding—no cough or cold. Better after rash
8	11/12	M	15/2/54	Fever and tonsillar infection preceding eruption. Fine macular rash with some coalescence. Occipital glands enlarged. Brother aged 4 years remained well
9	19/12	M	17/3/54	Rash to-day after 4 days' malaise. Now well
10	23/12	M	21/3/54	Feverish beforehand. Both T.M. very red. Ear infection seemed to be settling when seen again 2 days after rash, but flared up as typical acute catarrhal otitis media after another 48 hours
11	12/12	F	26/3/54	Typical rash with preceding fever
12	4/12	M	27/4/54	" " " " "
13	9/12	F	25/8/54	Typical " " on trunk—preceded by fretfulness and diarrhoea, which stopped when rash appeared

Present Series

In the brief description of individual cases which follows I have included only the comments which I jotted down in my visiting diary. In view of the youth of the patients and the invariable recovery I did not feel justified in taking blood samples to establish a leucopenia followed by a return to normal. However, during the period discussed, no cases of measles were notified to the medical officer of health and none of my partners in a practice of over 10,000 patients saw any cases of rubella. None of the older members of the families developed rubella, although I watched particularly for it. Cases 1 and 6 demonstrated the infectivity and incubation period. Case 1 was an adopted son aged 3½ years, who developed the rash two days after his adopted sister, aged 18 days, was introduced into the house from a maternity home outside the area. She developed the rash 12 days later. In all cases the rash was typical of roseola infantum. The last patient, whose illness occurred at a much later date, lived out in the country. The mother told me that two babies of about the same age, in near-by cottages, had had a similar rash and fever, but I did not see these cases.

Summary and Conclusion

Roseola infantum is a distinct entity with characteristic age incidence, epidemiology, signs, and symptoms which should be more frequently diagnosed.

It has been obscured in the past by a tendency to dismiss unusual rashes in infants as teething, sweat rash, drug sensitivity, or even "slight measles" or "mild scarlet fever," or, more excusably, German measles.

The alternative name of exanthem subitum—the unexpected rash—should not excuse our failure to think of it in any case of unexplained fever in the critical age groups. I personally prefer the more descriptive name originally bestowed by Zahorsky. Its recognition may prevent the unnecessary use of antibiotics or other drugs, and will certainly give reassurance to anxious parents.

Treatment has not been mentioned, as this is purely symptomatic unless the rare suppurative complications arise.

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The ways in which the two great Asian countries of India and Japan have struggled with their problems of excessive population are reviewed by P. E. P. in "Population Policies in India and Japan" (Planning Broadsheet No. 378). In India the need to feed adequately from domestic sources a population which increases by five million a year has been met by an imaginative series of five-year-plans covering industry, agriculture, and public services. In these, birth control is integrated with a family service including sex education and marriage guidance. In 1951 Dr. Abraham Stone, for W.H.O., organized controlled experiments in the rhythm method, which is in some respects consonant with Indian thought and custom, but the results were disappointing. The Indian Government, however, accepted most of the recommendations of the Family Planning Research and Programme Committee for encouraging clinics, research, and the setting up of voluntary as well as government agencies. In Japan only American financial aid has in recent years buttressed the nation's economy against collapse, says the report. Between 1945 and 1953 Japan's population increased by 15 million. In 1948 a Eugenic Protection Law facilitated the termination of pregnancy for physical and economic reasons, so that now over a million abortions are procured each year; abortion replaces infanticide, the traditional method of population control. Last August, however, the Japanese Minister of Welfare's Advisory Council on Population Problems announced that birth control was preferable to abortion and advocated government sponsored clinics. But these recommendations have not yet been adopted as the official policy.

MITRAL VALVOTOMY FOR DEXTROCARDIA WITH MITRAL STENOSIS

A CASE REPORT

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Rheumatic valvular disease in dextrocardia with situs inversus is said to be rare. Bleyer and Saphir (1953) have reviewed the literature on five hitherto published cases, and reported a sixth. According to them, Owen is credited with the first case report of mitral stenosis in dextrocardia with situs inversus, but since he could not definitely establish the aetiological factor for the mitral stenosis the authors did not include it in the review. Of the six cases reported, two were cases of aortic valvular affection, three of mitral stenosis with insufficiency, and one a case in which both mitral and aortic valves were involved.

The purpose of this paper is to report a seventh case of rheumatic heart disease in a case of dextrocardia with situs inversus, producing pure mitral stenosis, and to record the successful performance of mitral valvotomy on such a case. So far as we are aware, this is the first case of surgical correction of mitral stenosis in dextrocardia to be reported.

Case Report

An Indian labourer aged 19 was admitted to the medical wards of the Christian Medical College Hospital, Vellore, on November 18, 1953. His only complaint was progressively increasing breathlessness with effort, of three years' duration. Until 1950 he could cycle five miles at a stretch, besides carrying on his job of unloading bags of tobacco. But from that time he has felt increasing dyspnoea. In 1952 he had to rest after walking half a mile. Three months prior to admission he was so incapacitated that he voluntarily left his employment. He had no history suggestive of definite rheumatic fever or of nocturnal cough or dyspnoea. He had blood-stained sputum once, two years previously. The family history had nothing significant.

Physical examination showed him to be physically somewhat underdeveloped, moderately anaemic, with no cyanosis and without any clubbing of fingers or toes. His temperature was 98.6° F. (37° C.), pulse 86 a minute, regular, and of normal tension and volume. His respiratory rate was 20 a minute and his blood pressure 110/70. There was no visible venous pulsation in the neck or obvious deformity of the chest. The apical impulse was visible and palpable in the fifth right intercostal space, in the midclavicular line. A well-marked presystolic thrill could be felt over the systolic impulse. Auscultation revealed, close to the apex on the right side, a loud first sound, a normal second sound, and a slow rumbling crescendo presystolic murmur in the same area. There was reduplication of the second sound in the pulmonary area, but the reduplication disappeared on deep inspiration—indicating that it was probably due to the opening snap (Mounsey, 1953). The opening snap of the mitral valve was definitely well heard in this patient, just internal to the right nipple. Examination of the lungs revealed no abnormal physical signs. The liver and spleen were not palpable. There was no peripheral oedema. The central nervous system was normal.

His exercise tolerance was as follows : he was comfortable while walking on level ground for a distance of about 50 yards, but became uncomfortable if he tried to do more, and became acutely distressed on running. He was not able to do any work comfortably. He was classified as Grade 2 on the basis of the criteria laid down by Baker *et al.* (1952). Fluoroscopy revealed no obvious cardiac enlargement, but the pulmonary artery was somewhat prominent, and the left atrium was moderately enlarged, as observed by barium swallow. There was moderate enlargement of the right ventricle, but no enlargement of the left ventricle. Systolic expansion of the left atrium and calcification of the mitral valve were not visualized on fluoroscopy.

The electrocardiogram showed the standard Lead I to be a mirror image of Lead I in a normal individual, with inversion of all the complexes, which is characteristic of dextrocardia. aVR showed an RS pattern and an upward T wave, which suggests that it is facing the left ventricle in a vertical heart. aVL resembles an aVR tracing of a normally placed heart, showing a downward P and T, and this is pathognomonic of dextrocardia (with situs inversus) (Goldberger, 1950). Chest leads were taken on the right side of the chest as would normally be done on the left chest, and were designated VR_1, VR_2, VR_3, and VR_5. The R wave in VR_1 is suggestive of right ventricular hypertrophy.

The mitral configuration in a dextrocardiac was well seen in a skiagram. It was also noticed that the barium was flowing into a stomach which was placed in the right hypochondrium, thus confirming the diagnosis of situs inversus.

An angiocardiogram was done with the patient in the right posterior oblique position. The study of films at 8 and 11 seconds after injection showed an enlarged well-defined left atrium remaining opacified during that period. The small left ventricle remained poorly filled. Cardiac catheterization studies were not done, as the patient was not co-operative.

A diagnosis of mitral stenosis (grade II) in a dextrocardiac, with moderate incapacity of a progressive nature, was made, and as no obvious contraindications to operation were present he was submitted to a mitral valvotomy.

The operation was carried out on December 9 by one of us (T. T.), with endotracheal anaesthesia administered by Dr. K. Blott. The patient was placed on his left side and the thoracic cage was exposed by a right postero-lateral incision. The fifth rib was resected and the pleura was entered through the fifth rib bed. On opening the pericardium it was found that the heart was smaller than normal. The left auricle seemed to be somewhat dilated and there was no adequate ventricular filling. The auricular appendage was nearly 3.5 cm. long, and narrow, and its base was only about 2 cm. broad. It was felt that only the little finger could possibly enter the small auricular appendage. It was accordingly introduced through an opening, controlled both by a purse-string suture and by a Brock clamp. A tight mitral opening, not more than 0.5 cm. in diameter, was felt. A satisfactory commissurotomy was achieved. The finger was withdrawn and the auricular opening repaired. Histological examination of the auricular appendage revealed typical Aschoff bodies, thus establishing the aetiology of acquired mitral stenosis.

A post-operative follow-up study, about four months after operation, revealed that the patient's general condition was better. Whereas he could walk only 50 yards in comfort before operation, he now could walk about a mile. On physical examination the findings were more or less the same, the presystolic murmur being present as before. But there was a significant diminution in the intensity of the opening snap. The pulmonary second sound was reduced

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in its intensity. His blood pressure was 108/70. The lungs were clear. He could now be classified as grade I.

Comment

The diagnosis of dextrocardia with mitral stenosis was well established from physical findings, electrocardiographic studies, and angiocardiography. The aetiology of mitral stenosis was only presumptive before operation, but was established beyond doubt from histological study of the atrial wall.

Dextrocardia of the mirror type with situs inversus is probably not as rare as is commonly believed; but unless the condition is associated with other congenital cardiac anomalies or cardiac disease no symptoms are produced. These symptoms, when they do appear, are those of the associated abnormality and not due to the dextrocardia *per se*. The signs in the heart are, of course, found on the right chest instead of on the left.

It is claimed by some workers that the condition is common in white persons. It is worth noting, however, that the case reported prior to this was in a negro (Bleyer and Saphir, 1953), and our case is in an Indian.

Summary

A case of pure mitral stenosis due to rheumatic infection in a true dextrocardiac (with situs inversus) is described.

The successful performance of valvotomy in such a case is reported.

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IDIOPATHIC PULMONARY HAEMOSIDEROSIS IN A YOUNG ADULT

BY

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Idiopathic pulmonary haemosiderosis is being recognized with increasing frequency in recent years. Most of the cases described are in children, and the mortality rate is high. Considered in retrospect, the clinical picture is remarkably uniform, but early diagnosis may be difficult. Several cases of milder forms of the condition in young adults have been reported. In these the outlook is generally good and long remissions may occur. A further adult case is presented in this article.

Case Report

A National Service man aged 19 was first admitted to hospital in October, 1948, when aged 13, with a three-weeks history of intermittent frontal headache, pallor, and weakness. He described about six similar episodes since an attack of chicken-pox a few months previously. There was some dyspnoea on exertion. For four weeks he had been coughing up moderate amounts of brownish-red sputum. Oral iron therapy had had no apparent effect on the pallor. He had four sisters and nine brothers, all well except a brother with pulmonary tuberculosis. There had been no previous illness of significance.

On examination he was quiet and intelligent, and gave a clear story. He was very pale and listless. There were no signs of cardiac failure or jaundice, and no haemorrhagic manifestations. His tongue was normal. There were no enlarged lymph nodes and the spleen could not be felt, but a sharp rubbery liver edge was palpable 1 in. (2.5 cm.) below the costal margin. The pulse rate was 110 per minute and the blood pressure 120/80 mm. Hg. The heart and chest were normal, as was the central nervous system.

He was transfused immediately after admission to hospital. The haemoglobin level after transfusion was 9 g.%. This rose to 11 g.% after two weeks, and remained at this level until discharge one week later. No iron therapy was given at this time. The E.S.R. and the leucocyte count were normal. No urobilinogen was found in the urine.

The patient did not attend for observation, but was re-admitted with severe anaemia six months after leaving hospital. Dark-red sputum was produced during most of the time between the admissions to hospital. There were no new physical signs. The haemoglobin value was 4.1 g.%. The red cells showed anisocytosis and were poorly filled with haemoglobin. The icteric index was 8 units, and no urobilinogen was found in the urine. A red-cell fragility test showed haemolysis from 0.56% to 0.32% saline, almost the same as a control.

After a week, treatment with oral iron was started and the haemoglobin level rose rapidly, reaching 12.4 g.% after four weeks, when the patient was discharged. During this period the chest was *x*-rayed, but no abnormality was reported. He remained completely free of symptoms from July, 1949, until December, 1953, a period of 4½ years.

In December, 1953, the cough with reddish-brown sputum returned. This attack lasted six weeks. There were several minor recurrences during the next few months. He began his national service in October, 1953, and at the end of April, 1954, he arrived in Singapore; the haemoptyses appeared again a few days later. After three weeks he reported sick and a radiograph of the chest showed miliary mottling of the lung fields.

On admission to hospital his only symptom was a mild frontal headache on exertion. Apart from a slight sternal depression no abnormalities were found on examination. The mucosae were of good colour and there was no cyanosis or jaundice. The mouth and tongue were normal. There was no finger-clubbing. No lymph nodes were enlarged, and the spleen and liver were not palpable.

Investigations.—Several blobs of dark-brown sputum with a little mucus were produced each day. On microscopy numerous macrophages containing haemosiderin granules were seen, and a very few red blood cells. No acid-fast bacilli were found on direct examination or culture of six specimens. *X*-ray examination of the chest showed a normal cardiac shadow, confirmed on screening. There was diffuse mottling throughout the lung fields, maximal in the middle zones. There was no suggestion of a clear centre in any of the markings. Blood picture: Hb, 14.5 g.%; red cells, 5,000,000 per c.mm.; P.C.V., 45%; E.S.R., 36 mm. in the first hour (Wintrobe). Absolute values: M.C.V., 90 cubic μ; M.C.H., 29 $\gamma\gamma$; M.C.H.C., 32%. Reticulocyte count, 2.5%; leucocyte count, normal; platelet count, 200,000 per c.mm.; bleeding-time, 2 minutes; clotting-time, 4 minutes; prothrombin time, 15 seconds (equal to control). Capillary fragility test, negative. The indirect Coombs test and trypsin cell test showed no antibodies. Cold agglutination was negative at 1 in 4. Red-cell fragility showed haemolysis from 0.52% to 0.28% saline. Blood W.R. and Kahn test were negative; serum bilirubin, 0.5 mg. per 100 ml. on two occasions; serum proteins, 7.5 g.% (albumin 5.5 g.%, globulin 2 g.%). An E.C.G. was normal. The urine was normal on repeated tests, and no urobilinogen was present. The Mantoux test was negative to 1 in 10,000, but positive to 1 in 1,000 O.T. *X*-ray films of the skull, hands, long bones, and abdomen were normal.

During three months' observation there has been little change in the clinical condition. Daily haemoptyses continue, but the haemoglobin has remained between 13.3 and

14.6 g.%. The reticulocyte count has varied from 2.5 to 0.7%. No iron has been given during this period.

On the first few days in hospital there was a mild evening pyrexia up to 100° F. (37.8° C.), but this quickly disappeared. Slight headache recurs from time to time.

Aetiology

The basic pathological process in idiopathic pulmonary haemosiderosis is repeated intrapulmonary haemorrhage, resulting in deposition of haemosiderin in the lungs.

Pulmonary haemosiderosis also occurs after prolonged pulmonary congestion in mitral stenosis and in chronic left ventricular failure (Lendrum, 1950), and the pathological effects on the lungs are similar to the idiopathic forms. According to Hastings-James (1952), haemosiderosis may follow any form of pulmonary haemorrhage repeated over long periods. In the idiopathic form, however, fresh blood in the sputum is most unusual. It is probable that in these cases haemorrhage occurs diffusely into the alveoli themselves, haemosiderin is formed, and is engulfed by macrophages before the material is produced as sputum. The mechanism differs from the secondary types of pulmonary haemosiderosis in which there is focal bleeding followed by widespread absorption of the pigment.

Three main causative factors have been postulated as the possible fundamental lesions in idiopathic pulmonary haemosiderosis :

Defects in Pulmonary Arterioles and Elastic Tissue.—The extensive changes in the elastic tissue of the lungs seen in most cases at necropsy suggested that a defect in the elastic fibres of the pulmonary arterioles might be the primary lesion in pulmonary haemosiderosis. However, the necropsy assessment of elastic tissue change is difficult owing to the varying effect of distension (Nancekievill, 1949), and it is possible that some of the appearances seen were due to distortion. In some cases with only a short history before death there is no evidence of defect in the elastic tissues. On the whole it appears that these changes are the result, rather than the cause, of haemosiderosis, and the degree of elastic-tissue damage is roughly proportional to the duration and intensity of the disease.

Functional Changes in Pulmonary Capillaries.—Even those cases with a short history and no change in the elastic tissues show capillary stasis at necropsy. It is possible that dilatation of the capillaries in the pulmonary interstitial tissue and changes in the permeability of the capillary walls may lead to diapedesis of red blood cells and subsequent haemosiderosis. Recurrent haemorrhages will initiate fibrosis and destruction of elastic tissue.

Haemolytic Anaemia.—The haematological picture is of recurrent loss of red blood cells in the absence of external haemorrhage, associated with a compensatory increase in erythropoiesis. There is no evidence of decreased stability of the red blood cells or of failure of the blood-clotting mechanism. Cold auto-agglutinins are present in some cases in the acute attack. Wyllie *et al.* (1948) suggest that this is a secondary antibody response to red blood cells destroyed within the body. A positive Coombs test has also been found on occasion. Few cases have been examined in detail for circulating haemolysins, but in one case the haemolytic activity of the serum at body temperature was increased (Wiesmann *et al.*, 1953), and in another the life span of the patient's red blood cells on transfusion was shorter than normal (Jonsson *et al.*, 1951). If a haemolytic process is responsible for idiopathic pulmonary haemosiderosis, it is difficult to see why the lesions should be restricted to the lungs, unless the physiological conditions in the pulmonary capillaries increase the activity of the haemolysin.

From the present evidence it seems most likely that the fundamental lesion in idiopathic pulmonary haemosiderosis is a change in permeability of the pulmonary capillaries. This results in intrapulmonary bleeding, which produces fibrosis and elastic-tissue damage. Erythrocyte destruction within the body may cause the production of antibodies.

Discussion

The occurrence of idiopathic pulmonary haemosiderosis in adult life is rare. Kerley (1951) gives a brief description of five adult cases, and Cliff (1953) describes the case of a man who first had symptoms at the age of 20. After two acute attacks he was under observation for three years, and during this time had no symptoms or anaemia, but haemoptyses continued. This closely resembles the present case.

It seems likely, as Kerley (1951) suggests, that there is a mild form of the disease which persists for many years and may be found in young adults. These subjects may have typical recurrent attacks of severe anaemia in the later years of childhood or young adult life, and later settle down to a steady state with recurrent minor haemoptyses but no anaemia. Similar cases will probably be discovered more frequently with the increasing use of mass miniature radiography, and idiopathic pulmonary haemosiderosis must be considered in the differential diagnosis of miliary *x*-ray shadows in the chest of a symptomless young adult. Radiological changes may persist for several years after the anaemia and haemoptyses have disappeared. A diagnosis of Lederer's anaemia was made in the present case during the first acute attack. Some cases previously included in this group, which remained well after transfusion, may well be in fact idiopathic pulmonary haemosiderosis.

The diagnosis in the early stages is often difficult, as there may be no radiological changes at first. Walton and Williams (1951) found none for 18 months in their case, and in the patient described in the present article a chest *x*-ray film was reported as normal during the acute phase of the disease. Young people with anaemia of obscure origin should have sputum or gastric washings examined for macrophages containing haemosiderin. If *x*-ray changes are present lung puncture must be considered, to confirm the diagnosis. This is not without hazard, as the widespread destruction of elastic tissue that occurs greatly decreases the retractility of the lung, and may possibly prolong bleeding if a large vessel is damaged. It was thought to be inadvisable in the present case.

Summary

A case of idiopathic pulmonary haemosiderosis is described, and the aetiology of the condition is discussed.

The existence of a milder form of idiopathic pulmonary haemosiderosis in young adults is brought to notice.

It is suggested that the disease be more often considered in the differential diagnosis of miliary shadows in the chest *x*-ray film and of obscure anaemia in young people.

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The Ministry of Health has sent a memorandum to hospital authorities (H.M.(55)35) explaining that notifications of patients diagnosed in hospital as suffering from tuberculosis should usually be sent to the medical officer of health of the district in which the patient normally lives. Where, in the case of long-stay patients, the hospital itself can reasonably be regarded as the patient's place of residence, the notification should be sent to the medical officer of health of the district in which the hospital is situated.

A CASE OF LARGE DIVERTICULUM OF THE EUSTACHIAN TUBE

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Welin (1941a, 1941b, 1948) and Diamant (1941) have demonstrated, by lipiodol injection, the existence of small diverticula in the petrous part of the Eustachian tube, but no other diverticula in the bony portion have been described. The cartilaginous portion is closely related to the antero-medial aspect of the petrous part of temporal bone, and in radiographs is seen to project from the base of the skull. No diverticula have been reported in this portion of the tube. While stenosis of the pharyngeal orifice and hypertrophy of the pharyngeal tonsil might cause stasis in the pharyngeal part of the tube, this would hardly be sufficient to produce pouches in the cartilage; it would more probably lead to perforation of the drum or to the forcing of secretions into the attic or the mastoid cells. Diverticulum formation in the cartilaginous part must therefore be extremely rare, and it is for this reason that a large diverticulum at this site is reported.

Case Report

A man aged 27, with no relevant past history, began his present illness in December, 1953, without any previous malady except a severe coryza. It started with pain in the region of the angle of the left mandible and styloid process,

Lateral view of diverticulum after injection of lipiodol.

aggravated by clenching the jaw, and deafness in the left ear. Two weeks later a copious aural discharge compelled him to consult an otologist. After local and general treatment the discharge diminished slightly, but the pain remained. At that time he complained of crepitation and bubbling in his ear, especially after swallowing and mastication, deafness, and post-nasal discharge. The discharge was abundant at night, irrespective of the side on which he lay.

In September, 1954, we saw him for the first time. His left ear showed a small perforation of Shrapnell's membrane, a mucopurulent discharge, and granulations in the middle ear. The right ear, the nose, and the throat appeared normal. A plain radiograph showed slight opacity of the mastoid cells on the left side, but no abnormality of the petrous bone or the styloid process. Through the perforation 2 ml. of 40% lipiodol was injected, the patient reclining on the opposite side while his head was rotated so as to fill the epitympanic cavities. A lateral radiograph (see Fig.) now showed retention of lipiodol in two air cells of the petrous bone and a large pouch directly below the base of the skull, in the position of the cartilaginous portion of the Eustachian tube. The lateral oblique view showed that the diverticulum projected postero-anteriorly, and that it was cylindrical in shape. Its volume was about 0.5 ml., and it arose from the lower part of the tube, 3–4 mm. from the pharyngeal opening.

Radical surgery was obviously indicated, and the operation was performed a few days later. With a Hautant transmastoidal approach, the antero-medial aspect of the tympanic cavity was exposed and the granulations were removed. The orifice and isthmus of the Eustachian tube were then enlarged, and the diverticulum was identified without difficulty. Its mucopurulent contents were aspirated and its walls curetted and cauterized. The wound was drained and closed, 250 mg. of oxytetracycline being left in the tympanic cavity. The drain was removed on the fifth day and the wound healed by first intention. The aural discharge dried up, and the pain, crepitation, and post-nasal discharge had all disappeared by the tenth day. The drum perforation was still under treatment at the time of writing, and had nearly closed.

Discussion

It seems most unlikely in this case that the pouch was congenital, as such anomalies are not found in cartilage. A more acceptable theory is that it was the result of degeneration and an inflammatory process secondary to obstruction of the pharyngeal orifice, the perforation of the drum being due to the same cause. Once the diverticulum had formed it became a focus of chronic infection, probably due to the most destructive organism of the middle ear, *Bacillus mucosus capsulatus*. The presence of previously existing air cells can be ruled out, as cartilage never contains them. The subacute course of the infection and the absence of calcification and caseous material in the cartilage are against a tuberculous origin. Once the diverticulum had been obliterated and normal drainage of the tube established, the symptoms disappeared.

Summary

A single large diverticulum of the cartilaginous portion of the Eustachian tube is described. This condition has apparently not been previously reported. The symptoms of pain, aural and post-nasal discharge, and crepitation in the ear were cured after surgical treatment. The aetiology of the condition is discussed.

Our thanks are due to the Director of the hospital, Dr. Abdoul Rassoul Haddad, for his encouragement and help during the preparation of this article.

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A number of rare incunabula, besides medical books of the seventeenth and eighteenth centuries, are to be included in the sale of the late Dr. T. C. P. Kirkpatrick's library at Sotheby's on April 25–27. (Dr. Kirkpatrick was for 44 years registrar of the Royal College of Physicians of Ireland.) Among the incunabula are: Aegidius Corboliensis: *De Urinis et Pulsibus*, Lyons, 1500 ?; Philippus Beroaldus: *Declamatio*, Bologna, 1497; Celsus: *De Medicina*, Venice, 1493 and 1497; Bernardus de Gordonio: *Practica sive Lilium Medicinae*, Ferrara, 1486; Lactantius: *Opera*, Venice, 1493; Mesue: *Opera Medicinalia* (a fragment), Venice, 1490; Mesue: *Opera* (incomplete), Venice, 1490–1; Placentinus de Saliceto: *Summa Conservationis et Curationis . . . item Chirurgia*, ms., Italy, 1473; Pliny: *Historia Naturalis*, Parma, 1480; Rhazes: *Liber ad Almansorem*, Venice, 1497.

MIGRAINE AS A SEQUEL TO INFECTION BY L. ICTEROHAEMORRHAGIAE

BY

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Of recent years migraine has been attributed to a bewildering assortment of causes, ranging from heredity (Friedman and Wilson, 1947), through allergy (Crowe, 1946), and personality (Alvarez, 1947), to the comprehensive list drawn up by von Storch (1947). The estimate of Scott (1941) that "much has been written and little has been established as to the aetiology of migraine" seems largely true to-day.

The following observations, which were made in the course of a follow-up study of former cases of Weil's disease in the South Wales coalfield (Atkins *et al.*, to be published), seem worthy of record even at the risk of further complicating the subject.

Method of Study

During 1953 all earlier cases of serologically proved Weil's disease which were known not to have been immediately fatal were traced. Fifty-eight such cases were known to have occurred in the area of the coalfield, but five of the patients were found to have left the area and three had died by 1953. Fifty cases therefore remained for study, and in all but one the specific agglutination reaction remained positive at a titre of 1 in 100 or more in 1953. Each man was questioned about his health both before and after his attack of Weil's disease and clinically examined; in addition to general questions designed to elicit anything thought worth mention by the patient, the questionary included specific questions about various symptoms, one of which was headache.

Although estimates are available of the prevalence of migraine among the general population of the United States, it was thought worth while to make use of a control group of South Wales miners known to be serologically negative for *L. icterohaemorrhagiae*. These were also questioned about their experience of headache, and it is hoped that variation in the interpretation of answers, as well as in the definition of migraine, was avoided by the observer's use of similarly phrased questions for both groups.

The definition of migraine which has been adopted is based on that of von Storch, quoted by Marshall (1949). This requires that, to qualify as migrainous, headaches should be recurrent, though not necessarily hemicranial; and they should be accompanied by at least one of the following features: associated visual symptoms—classically scintillating scotomata; temporary gastro-intestinal symptoms—usually nausea or vomiting; or hereditary migraine diathesis, occasionally with an epileptic history. Since the follow-up study had not been designed to investigate the aetiology of migraine, information on the last alternative criterion of von Storch is not available. The diagnosis therefore rests here on a history of recurrent headache with either scotomata or gastro-intestinal disturbance, or both; it can perhaps be said that these criteria are thus more strict than those of von Storch. It may be that opportunity will later occur to study the hereditary factor.

Prevalence of Migraine

Among the 50 men in the control series, 6 (12%) described headaches satisfying the above criteria. This represents a prevalence greater than was to be expected from estimates in America (Scott, 1941; Friedman and Wilson, 1947), where about 7% of the population are said to be affected—the more so as females are said to be two or three times as often affected as males, and the control series here comprised males only. This point may be borne in mind when considering the prevalence observed in the former cases of Weil's disease.

Among the latter there were 24 men who suffered from migraine by the same criteria—a prevalence of 48%, or nearly half the cases. This difference of prevalence in former cases of Weil's disease and the controls is highly significant ($\chi^2 = 15.4$, n = 1, $P<0.001$). It is clear that had comparison been made with American estimates of prevalence among the general population, instead of with the control series, the prevalence among former cases of Weil's disease would have seemed even more striking.

The prevalence of migraine among former cases of Weil's disease of different ages at the time of their infection is shown in Table I. As the period elapsing since infection might also have influenced the prevalence of migraine, these cases are also broken down into their quinquennia of infection.

TABLE I.—*Age at Infection with L. icterohaemorrhagiae, and Date of Infection by Quinquennia, of Men in South Wales Surviving Attack. (Numbers Subject to Migraine in Parentheses)*

Ages	1935–9	1940–4	1945–9	1950–	Total
11–20	—	—	3 (2)	1 (1)	4 (3)
21–30	5 (3)	5 (3)	3 (1)	1 (1)	14 (8)
31–40	5 (1)	2 (1)	5 (3)	1	13 (5)
41–50	3 (1)	6 (3)	3 (1)	1	13 (5)
51–60	—	2 (2)	4 (1)	—	6 (3)
Total ..	13 (5)	15 (9)	18 (8)	4 (2)	50 (24)

It will be seen that migraine occurs fairly evenly among these different categories, there being no tendency for a rising prevalence with age. This fact is of importance in establishing the validity of the control series; for this was unavoidably deficient in men above the age of 50, and contained a disproportionate number of middle-aged men (Table II). It seems likely that this lack of correspondence in age composition of the two series has not overestimated the difference in prevalence of migraine between them.

TABLE II.—*Ages, in 1953, of Former Cases of Weil's Disease and of Controls. (Numbers Subject to Migraine Shown in Parentheses)*

Age	Former Cases	Controls
11–20	1 (1)	0 (0)
21–30	4 (3)	6 (1)
31–40	10 (5)	17 (1)
41–50	12 (5)	22 (3)
51–60	13 (6)	5 (1)
61–70	10 (4)	0 (0)
Total	50 (24)	50 (6)

As might be expected, both the frequency and the severity of attacks were described in most of the former cases of Weil's disease as diminishing with the passage of years, the course of the disorder being similar to that generally seen in ordinary migraine sufferers. On the other hand, as mentioned above, it originated in those of 45 and over nearly as frequently as in those infected at an earlier age.

Among the 24 cases in the Weil's disease group there were 4 individuals whose migraine preceded their infection. The influence of this infection upon established migraine varied, but only one man described aggravation. Subtracting these cases, it will be seen that migraine appeared in 20 cases (40% of those infected) as a sequel to this specific infection, and during convalescence in most cases.

Lest suggestion between one case and another might have led to distortion of histories, upon which alone the diagnosis of migraine must be made, care was taken to keep the men separate at the time of interview. Moreover, since Weil's disease had occurred mainly in relatively closed communities, it was possible to analyse results for each of these geographical groups separately. The results of such analysis show

similar prevalence of migraine in each of the four main widely separated areas of the coalfield where cases have occurred.

Allied Vasomotor Disturbances

In view of modern concepts of migraine as a localized cerebral vasomotor disturbance allied to Ménière's disease (Atkinson, 1943) it may be of interest to record the following observations.

Among the 50 men there were eight who described giddy attacks dating from their infection, but none had associated tinnitus or gross deafness for conversational speech. Only one of these had a diastolic blood pressure of over 100 mm. Hg (mean of three readings at rest). All but two of them were migraine sufferers, though the precise chronological relationship between headaches and giddiness was not investigated. Vertigo was thus associated with headache in a quarter of the cases of migraine.

No cases of epilepsy or its equivalents were found among the 50 cases, nor was a family history of such forthcoming in any of them.

In six cases there was complaint of numbness, tingling, and clumsiness of the fingers and hands, often on waking, and usually more severe in cold weather, since the specific infection; but facilities for proper investigation of these phenomena were lacking. A further patient complained of frequent attacks of "cramp" in the legs and hands since his infection.

Significant hypertension, as judged by a mean resting diastolic pressure of over 100 mm. Hg (there were no cases with signs of failure), was found in 6 of the 24 migraine sufferers. Of these, four were over 50 years of age and the youngest was aged 39 at the time of examination. Among the 26 free from migraine only two had significant hypertension. In addition, before this follow-up study was begun, one former patient had died of a stroke at the age of 65, another of cardiac failure following hypertension aged 52, but it is not known whether either of these men suffered from migraine during life.

Discussion

Such a prevalence of hypertension in men of these ages might be found perhaps in 50 men drawn from the general population. However, this finding of hypertension in a quarter of the cases of migraine may be in accord with the views of Gardner *et al.* (1940) that migraine sufferers may become hypertensive in middle life.

The finding of so large a number of cases of migraine among this series, small as it was, does seem to indicate a probable causal relationship between infection with *L. icterohaemorrhagiae* and migraine. There exist other areas of Britain where this infection is not uncommon, and which offer opportunity for confirmation of this point.

It seems that, if such a causal relationship is established, existing views of the aetiology of migraine may need some modification. Such specific infection is not mentioned in the comprehensive list of causes drawn up by von Storch (1947), nor in the secondary "trigger mechanisms" listed by Friedman and Wilson (1947). Moreover, the latter's insistence upon a primary inherited susceptibility to migraine would appear untenable in the face of such a prevalence as the 48% reported above, even though family histories have been neglected in this study.

It seems possible that migraine may result from the meningitis which is so often a feature of infection with *L. icterohaemorrhagiae*. This would account for the occurrence of vasomotor disturbances in other regions, if those were also established as a significant sequel to the infection. It may be that follow-up investigation of other types of meningeal infection would throw light on this possibility.

The onset of migraine regardless of age in this series underlines the possibility of this diagnosis being correct even in those presenting symptoms late in life. In areas where infection with *L. icterohaemorrhagiae* occurs it would certainly seem wise to test the appropriate agglutination reactions before submitting the patient to such procedures as cerebral arteriography.

Summary

The health of 50 men who had formerly been infected with *L. icterohaemorrhagiae* has been studied.

The prevalence among them of cases of hypertension, and of symptoms suggesting various types of vasomotor disturbance, is recorded. Of these former cases of Weil's disease 48% suffered from migraine. In a control group the prevalence of this disorder was 12%. The difference is of high statistical significance.

The literature on the aetiology of migraine is briefly reviewed and discussed in the light of these findings.

Thanks are due to the miners who so readily co-operated in this study; and to Dr. J. C. Broom, of the Wellcome Research Laboratories, and Dr. R. W. S. Harvey, of the Public Health Laboratories, Cardiff, for performing agglutination reactions in these cases and, with Dr. C. R. E. Freezer, of Church Village Hospital, for help in planning the follow-up of them.

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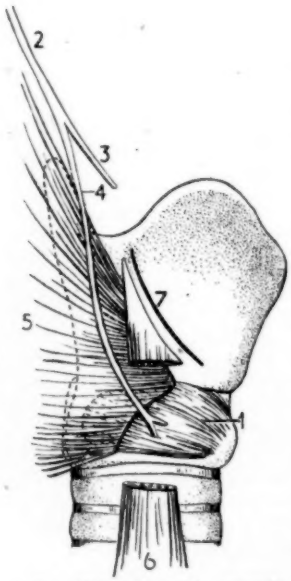
Medical Memoranda

Thyroid Enlargement and the Crico-thyroid Muscle

The importance of the crico-thyroid muscle has not been stressed in any textbook dealing with diseases of the thyroid gland and the operations carried out for the cure of these diseases. The muscle takes origin from the anterior part of the cricoid cartilage and runs upwards and backwards in two parts—an oblique part inserted into the lower border of the thyroid cartilage in front of the oblique line, and the horizontal part inserted into the inferior cornu and the lower border behind the oblique line. The nerve supply is the external branch of the superior laryngeal nerve, which comes from the vagus. The nerve runs *superficial* to the inferior constrictor of the pharynx but deep to the sterno-thyroid muscle; both these muscles are attached to the oblique line on the thyroid cartilage. The diagram makes these details clear.



1, Crico-thyroid muscle. 2, Superior laryngeal nerve. 3, Internal laryngeal nerve. 4, External laryngeal nerve. 5, Inferior constrictor muscle. 6, Sterno-thyroid muscle. 7, Oblique line.

The function of the crico-thyroid muscle is to tense the vocal cords. Damage to the muscle or its nerve will produce a voice which is incapable of varying its pitch. It can be described as a monotone voice at about F, middle register.

The patients complain that they are unable to sing or alter the pitch of the voice; also, the voice gets tired easily. It is not

husky, but is slightly tremulous. There is no difficulty in breathing. The trouble can arise before any operation on the thyroid gland, especially in a very large thyroid with an isthmus spreading out over the cricoid and lower part of the thyroid, from direct pressure on the muscle or its nerve. The muscle or nerve may be damaged, or even removed, during the freeing of a large isthmus from the underlying structures. There is a third possibility—that the nerve or muscle may be strangled by fibrous tissue following operation, especially if a clot under the infrahyoid muscle has been allowed to organize.

The treatment of a pre-operative case is careful partial thyroidectomy, to give the muscle or nerve a chance of recovering. There is no useful treatment for a post-operative case. From the above remarks it is clear that before partial thyroidectomy the patient's voice should be carefully studied, and if abnormal an examination by a competent laryngologist should be carried out. I feel that when confronted with the crico-thyroid syndrome after operation many surgeons with a limited experience of thyroid surgery have wrongly assumed that the recurrent nerve has been damaged.

Two patients of mine illustrate the mild trouble resulting from crico-thyroid inefficiency. Both had a very large thyroid, with a husky voice, and had some difficulty in breathing. One was a school mistress in a primary school, the other a local manager of an insurance company. After partial thyroidectomy the latter had complete restoration of his voice, while the first had a crico-thyroid syndrome four years later. She has some difficulty in talking to her classes for more than half an hour, but she agrees with me that lectures and talks lasting more than half an hour are rarely appreciated by the audience.

Many people in this country are incapable of altering the pitch of the voice; also many have no appreciation of pitch alteration in a voice or musical instrument. It seems that the former suffer from some congenital trouble in the crico-thyroid, just as the latter suffer from internal ear trouble.

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Ruptured Uterus with Survival of Extrauterine Twin

The following unusual case is thought to be worthy of record.

CASE REPORT

A native woman was admitted to the Zomba African Hospital at 5 p.m. on October 17, 1952. She stated that she had been in labour 32 hours. About midnight on the 16th–17th, during strong contractions with no advance, the pains seemed to cease, being replaced by a continuous pain in the abdomen, especially in the flanks. She was a slim woman in the early thirties, a 2-para. There had been no trouble with the previous labours, although the babies had been large.

On admission she was seen by the sister, who reported that urine had been passed just before examination. The sister carried out a vaginal examination. The vulva was oedematous. What appeared to be a rectocele could be seen in the vaginal orifice. The vertex was felt in mid-cavity. No os could be felt, but the head seemed to be covered by a layer of tissue almost corresponding to a thin well-taken-up cervix. The sister thought this membrane to be part of the "rectocele," although she could not understand why she was unable to pass her fingers between it and the head at a higher level. There was no vaginal bleeding.

The patient was seen by me an hour later. She was ill, but her condition was fair and she was not unduly shocked. The abdomen was distended and tender. There was a visible tumour rising above the pubes, so resembling a distended bladder that I could not accept the African midwife's assurance that the patient had again passed urine, and catheterized her myself. The catheter entered easily, withdrawing a little urine with no effect on the tumour. It thus became evident that this was the uterus. Above it, foetal parts lay immediately under the abdominal wall. Ruptured uterus was confidently diagnosed, no further vaginal examination being performed. In view of the prominence of the uterus and absence of external bleeding it was expected that the body of the child had passed out of a posterior rent, leaving the head jammed in the pelvis.

After anti-shock therapy, and with intravenous saline running, the abdomen was opened. There was a moderate amount of blood in the peritoneal cavity. A transverse anterior tear of the lower segment of a well-contracted uterus was seen with a T extension through the cervix into the vagina. A small full-term dead foetus was removed from the abdomen complete with placenta and membranes. It was then noticed that there was a large tumour behind the uterus responsible for pushing it forward. This proved to be the back of a second child lying in the occipito-anterior position with the head well down in the pelvis, in an apparently unruptured amnion. The amnion was slit and the child delivered. To our amazement it was alive and cried immediately. The membranes had to be peeled from the rectosigmoid, the left broad ligament, posterior surface of the uterus, the sides of the pelvic cavity, and coils of small intestine, within a mass of fibrinous peritoneal adhesions. The placenta, however, was not adherent. Its amniotic surface was normal, but the decidual surface was covered over by a membrane except along a narrow pedicle, not more than 3 cm. wide, through which the vessels ran into its substance.

It is to be regretted that the origin of the pedicle was not accurately noted owing to the presence of oozing and the necessity for haste. The impression was that it arose from the mesosigmoid, but it may have been from the region of the left broad ligament, which is more likely. It was the only impediment to easy removal of the placenta. Subtotal hysterectomy was performed, with repair of the cervix and vaginal vault. The patient stood the operation well. One pint (570 ml.) of blood was given next morning, and she made a smooth recovery. The baby, a female, was normal in all respects and weighed 5 lb. 2 oz. (2.3 kg.). It was seen at intervals up to three months after leaving hospital and was thriving. Thereafter, as commonly happens in African practice, mother and child were lost sight of.

COMMENT

The probable course of events was that the twin, surviving from a tubal rupture, developed with the head in the pelvis. When labour began, its head prevented entry into the pelvis of the presenting part of the intrauterine twin, with consequent rupture of the overstretched anterior aspect of the lower segment. The abnormal appearance of the placenta of the extrauterine gestation is difficult to explain, except on the basis that at the time of tubal rupture the decidual contact of the foetus with the tube was not entirely lost, and as it grew the placenta was gradually drawn out from the tube *pari passu* with repair and reperitonization of the rent, the process also continuing over the decidual surface, finally forming a pedicle of the remaining contact.

It is a remarkable coincidence that two days later another full-time extrauterine child was delivered alive in this small hospital dealing with about 500 births in a year and with no previous records of such an occurrence. In this case the mother was unfortunately lost owing to severe persistent bleeding from the placental site as a result of possibly unwise separation of its attachments to the viscera, from the shock of which she failed to recover. The infant was a female weighing 4 lb. 2 oz. (1.9 kg.) also without obvious abnormality. It was also thriving on discharge from hospital.

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Reviews

REPRINTING OF A CLASSIC

Atlas of Congenital Cardiac Disease. By Maude E. Abbott, B.A., M.D., F.R.C.P.(Canada). (Pp 62+x; illustrated. $5.) New York: American Heart Association. 1936, reprinted August, 1954.

This reprinting of Maude Abbott's well-known monograph will bring great joy to many. When this book was reviewed in these pages on its first appearance in 1936 it was stated that it "must be included among the few modern medical publications destined to become classics." This prediction has proved to be amply justified, for it has been almost impossible to obtain a copy, and many first-class libraries have also been without one. The American Heart Association is to be congratulated, not only on its action in publishing this facsimile, but on the excellence and accuracy of its production. Everyone interested in congenital heart disease from its present manifold aspects will now be able to acquire a copy, and libraries will be able to correct their deficiency. However, those who want the book will have to hurry, as only 1,500 copies have been printed. One would have thought that several times this number will be needed, and we must hope that other impressions will follow.

The *Atlas* is, as is well known, based on a study and analysis of 1,000 cases of congenital heart disease, its statistical analysis being often quoted. It contains an excellent presentation of the development and comparative anatomy of the heart as a basis for the clinical and morbid anatomical presentations, which are profusely and well illustrated, even for to-day with our better radiography and electrocardiography and the revelations of angiocardiography. It is a pity that the author was never able to do what she states in the preface was her intention—namely, to produce a further volume.

The book has only one drawback—its large, awkward size, which makes it difficult to handle and very difficult to find shelf room for. It would have been so much better if it had originally been produced only half the size. No change, of course, was possible in this facsimile.

RUSSELL BROCK.

ENZYME ACTION

A Symposium on the Mechanism of Enzyme Action. Sponsored by the McCollum-Pratt Institute of the Johns Hopkins University. Edited by William D. McElroy and Bentley Glass. (Pp. 819+xvi; illustrated. 88s.) Baltimore: Johns Hopkins Press. 1954.

This volume records the proceedings of a symposium held at the Johns Hopkins University in June, 1953. The papers, with a record of the relevant discussions, are grouped into five main sections: I. Protein configuration and biological activity. II. Kinetics of enzyme-catalysed reactions. III. The function of metals in enzyme catalysis. IV. The mechanism of electron and hydrogen transport. V. The function of enzymes in group transfer. As is natural, Section V is the longest, taking up rather more than one-third of the whole volume. The book concludes with a masterly summary by Bentley Glass of the facts and ideas discussed, which amounts to 65 pages (approximately 8%).

In a hydrolytic reaction the elements of water are added across a chemical linkage to produce its fission. In group-transfer reactions an organic molecule plays the role of the water in a hydrolytic reaction, and as a result synthetic process of great importance can occur. In such group-transfer reactions the enzyme molecule itself enters as a reactant, apparently with the function of preserving energy that might otherwise be lost during the chemical exchanges. The reactions to be studied in detail are therefore often somewhat complex, but an excellent account of most of them is given in Section V of this book.

The book will appeal to the expert, and for the expert it is extremely readable—indeed, absorbingly so. Dr. Fritz Lipmann, Nobel Laureate in Medicine, puts forward an interestingly new idea about the possible mechanism of protein biosynthesis, a subject of first-rate importance in the study of tissue growth. The accounts of the discussions are good, and are occasionally longer and possibly more interesting than some of the papers themselves.

The volume is well produced, and an adequate index greatly enhances its value. This book of 819 pages, formidable to the non-expert in its size and content, is an indication of the exuberance of biochemical research in the United States—an exuberance which gives birth to an ephemeral volume of such impressiveness. That such exuberance must assist directly or indirectly in the elucidation of many outstanding problems in medicine cannot seriously be doubted.

F. G. YOUNG.

DISEASES OF THE SPLEEN

La Rate et ses Maladies. By Gabriel Gelin. Preface by Professeur Agrégé Jean Bernard. (Pp. 299; illustrated. 2,200 fr.) Paris: Masson et Cie. 1954.

This book on the spleen and its diseases is one of a series by different authors, published by Masson, which now includes "The Spleen as a Reservoir" (1930), "Functional Exploration of the Spleen" (1933), "The Spleen in Haematological Pathology" (1936), "Splenic Puncture" (1936), and "Hypersplenism" (1953). Apart from the work of Barcroft and Knisely on the splenic circulation, no fundamental discoveries in the physiology and pathology of the spleen have been made over this period, and the preoccupation of the French school of haematology with the spleen is to be explained by the frequency of various forms of tropical splenomegaly in their North African possessions and by the occurrence of Cooley's anaemia, with its characteristic splenomegaly, throughout the Mediterranean basin.

The approach of these various monographs is clinical and morbid-anatomical rather than experimental or quantitative, and the present book consists of a series of essays or reviews, each chapter being complete in itself. The main subjects discussed are the structure and function of the spleen, hypersplenism, the parasitic splenomegalies, tuberculosis of the spleen, myeloid metaplasia of the spleen, Gaucher's and Niemann–Pick's diseases, tumours of the spleen, and the various syndromes associated with hypertension and thrombophlebitis of the portal and splenic veins. The material is clearly presented and up to date. The feature of the book of particular value to English readers will be the bibliographies, which are of a richness unusual in French publications and which embrace the Continental as well as the Anglo-American literature. There are, in fact, over 2,300 references. As in many French books, there is a table of contents but no index.

L. J. WITTS.

PSYCHOPHYSIOLOGICAL MEDICINE

Psychophysiologic Medicine. By Eugene Ziskind, M.D. Foreword by John C. Whitehorn, M.D. (Pp. 370. 52s. 6d.) London: Henry Kimpton. 1954.

The application of the methods of medical science to the problems of psychiatry has meant much to the sick in mind, and it is now the turn of mental science to repay some of its debt to medicine by throwing light on those disorders which, while manifest in physical signs and symptoms, have their aetiology to a greater or less degree in psychological maladjustment. Psychological medicine, however, has developed a method of approach of its own which requires a considerable mental effort on the part of the physician if he is to learn enough of it to apply to the psychosomatic aspects of his practice. In order to do this he may have to reverse the process of specialization which threatens to restrict the field of interest of the general physician, and to study the human factors explored by his psychiatric colleague. Dr. Ziskind is an experienced teacher of clinical psychiatry who has maintained contact with the advancing front of medicine. He has paused in his life's work to

write what is, in effect, an intelligent physician's guide to psychological medicine.

Without pandering unduly to the busy doctor's demand for information which will produce quick results, he has tried to thin out the jungle of psychiatric literature and to preserve the more useful and permanent growths. In the first two parts he introduces the reader to simplified principles of psychopathology with which few but the followers of militant and exclusive schools of thought will quarrel. He then shows in some detail how psychiatric methods of clinical investigation can be applied to psychosomatic illness. This is followed by chapters on differential diagnosis, social factors, psychotherapy, and on psychiatric emergencies.

After giving an account of the methods of psychiatry as applied to general medicine, the author proceeds, for the benefit of those whose interest he has aroused, to give a general review of psychological medicine which includes outlines of the contributions made by the principal schools. This section is thoroughly up-to-date and notably free from strong bias. There is also a sound guide to further reading which will be of value to those embarking on a fuller study of the subject. As the book proceeds, the fruits of the author's experience and teaching become evident, and his account of the simple adaptive mechanisms found in the medical patient is readable and clear. Finally he abandons the role of a reporter and ends with a critique of the evidence that certain diseases—asthma, peptic ulcer, essential hypertension, and ulcerative colitis—which have been rather freely labelled as psychosomatic, are in fact of this nature. Here careful arrangement of the conflicting testimony of the psychologizers who have overreached themselves contributes strongly to the author's argument that the evidence is in the main insufficient. This subject serves as a text upon which he bases an exposition of some of the loose thinking and plausible writing which have appeared since psychopathology has been trying to engorge and digest the general adaptation syndrome. It may be that Dr. Ziskind has found a formula for making applied psychology palatable to physicians.

The style of writing is a little bare and technical for British readers, and the pattern of medical practice in the Western United States a little unfamiliar, but the book gives a clarifying account of the psychosomatic approach. In a foreword Dr. Whitehorn, of the Johns Hopkins Hospital, whose own outlook is mainly psychoanalytic, indicates that the author's presentation of this subject may not be seriously irritant either to the busy physician or to the majority of psychiatrists. Rather long for continuous reading in the study, it is well designed for the night-stop bag or the bedside. The price is such that many physicians will prefer to borrow rather than to own this book.

ALEXANDER KENNEDY.

THE STORY OF INFECTIOUS DISEASES

Pomp and Pestilence. Infectious Disease, its Origins and Conquest. By Ronald Hare, M.D. (Pp. 224. 12s. 6d.) London: Victor Gollancz Ltd. 1954.

Medical history has no official status in the training of the doctor, and it is left to individual teachers to indicate, if they please, the great importance of disease on the course of human history, whether it be syphilis or apoplexy or madness in some powerful king or dictator, or great plagues destroying armies and civilizations.

Professor Hare's small book tells the story of the development of parasitic infections in man, and indicates the way in which some of the major pestilences—smallpox, typhus, plague, cholera, dysentery, and in our own time influenza—have had greater victories than kings or conquerors. He goes on to say how many of the infections have been overcome by community or individual effort, but ends on a pessimistic note regarding the effects of the control of infection in allowing growth of populations in backward countries more quickly than there will be the wherewithal to feed them.

The writing of medical history requires much general reading, and the author shows that he has delved well into the literature. He gives at the end various explanatory notes and numerous references for further reading. Let us hope that teachers of bacteriology and others will recommend this book to their students as being at least as important as the orthodox textbook.

R. CRUICKSHANK.

PRISONERS OF THE JAPANESE

Operation Rangoon Jail. By Colonel K. P. MacKenzie, R.A.M.C.(ret.). Foreword by Brigadier J. G. Smyth, V.C., M.C., M.P. (Pp. 201; illustrated. 15s.) London: Christopher Johnson. 1954.

"War," as General Sherman once said, "is hell," and one of its worst manifestations is imprisonment at the mercy of a sadistic enemy. Colonel MacKenzie, who was over 50 at the time, suffered this fate in Rangoon jail at the hands of the Japanese, and he has here set down the plain tale of his sufferings. It is a moving story. Deprived of every amenity, half starved, forced to do menial work though physically unfit, punished brutally for trivialities—in fact, treated as outcasts—Colonel MacKenzie and his 500 fellow-prisoners kept up their morale through three long years and finally won through. On the Colonel's fifty-fifth birthday the Scots in the party organized a parade and inspection in his honour—a magnificent effort. The Colonel addressed them in a humorous manner: "I have never seen a finer body of men. You haven't a decent pair of boots or socks amongst you. I have reason to believe, however, that this is not altogether your fault."

The author can be scathing, as when he comments on the fact that his guardians in Rangoon aped the European, but succeeded only in "being a tenth-rate caricature of a third-rate Continental comedian giving an impression of an Englishman."

The Japanese in Rangoon did not recognize the Geneva Convention, and no Red Cross parcels came through to the prisoners. Even worse was their attempt to break the spirit of their prisoners. In a memorandum given to each prisoner occurred this passage: "Though you might think it enough to lay down your arms, we should never admit those who are not obedient in their thoughts or spirit as a true surrender." Colonel MacKenzie writes, "Perhaps this work of mine will cause some to think again." It has caused at least one person to do so.

ZACHARY COPE.

HAEMATOLOGICAL TECHNIQUE

Haematological Technique for Medical Laboratory Technicians and Medical Students. By E. M. Darmady, M.A., M.D.(Camb.), F.R.C.P., and S. G. T. Davenport, F.I.M.L.T. (Pp. 197+viii; 4 coloured plates, 23 figures. 18s.) London: J. and A. Churchill, Ltd. 1954.

This book was written "for medical laboratory technicians and medical students," but satisfies the needs of neither. The description of technique is too sketchy for the proper training of technicians; for example, the three pages devoted to various methods of visual haemoglobinometry by dilution methods give no description of matching technique. A fourth page describes the expensive and relatively inaccurate M.R.C. grey-wedge photometer, yet there is no description of the photoelectric methods that are the routine in most laboratories. Blood grouping, which constitutes half the work of haematological laboratories, is not mentioned at all.

The sections on clinical haematology are perhaps adequate for technicians—although much space is given to rarities—but are quite inadequate for medical students, who should be taught to think primarily in terms of the whole patient, not of laboratory findings.

Besides some grave errors of fact (iron absorption is ascribed to the gastric mucosa) the book contains a number of errors in technical procedures, suggesting careless revision of the text.

MARTIN HYNES.

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VACCINE AGAINST POLIOMYELITIS

Seldom has an item of scientific news aroused such intense and universal interest as last week's announcement of the successful outcome of the field trials with a poliomyelitis vaccine developed by Dr. Jonas E. Salk and his staff at the University of Michigan. The results, assessed under the expert guidance of Dr. Thomas Francis, jun., were released by the National Foundation for Infantile Paralysis to coincide with the tenth anniversary of the death of President Roosevelt and have been acclaimed as an outstanding achievement. The complete report is not yet available, and only limited accounts have appeared in Britain.[1]

Ten years ago there seemed to be little prospect of immunization against poliomyelitis in the immediate future. Previous attempts in the 1930s with vaccines prepared from monkey nervous tissue were abandoned as unsafe.[2] But latterly the whole outlook changed and a new era in poliomyelitis research started. Four salient points previously reviewed in this *Journal*[3 4] are worth emphasizing now. First and foremost came the discovery by J. F. Enders, T. F. Weller, and F. C. Robbins that poliomyelitis virus could be grown in tissue culture of non-nervous tissue and with it a complete change in experimental methods and outlook.[5] Secondly, the existence of three distinct strains of virus was definitely established.[6] In the same year I. M. Morgan showed that in vaccinated monkeys resistance could be correlated with the level of serum antibody.[7] And lastly it became increasingly clear that the old idea of poliomyelitis as a neurotropic infection was no longer tenable. Following the work of D. M. Horstmann and others[8] and D. Bodian,[9] a new concept of the pathogenesis developed with viraemia as an essential precursor to infection of the central nervous system. On this basis it seemed logical to prevent paralysis by stimulating the production of antibody in the blood stream.

Rapid progress was made in tissue-culture methods.[10] It became clear that high concentrations of virus could be produced in tissue cultures of monkey kidney in a simple medium with a low protein content. Salk developed an experimental vaccine containing a mineral-oil adjuvant, and with it some degree of immunogenic activity was established.[11] A number of changes were made before the vaccine used last year was completed. The mineral-oil adjuvant was omitted and the process of inactivation with formaldehyde was changed.[12 13] A team of Canadian and British scientists played a substantial part in the preparation of this vaccine at the Connaught Laboratories in Toronto, where methods of mass production had been worked out.[14] The crude vaccine containing live virus was shipped to the U.S.A., where it was inactivated and tested. A leading member of the Anglo-Canadian team is now in charge of vaccine production by a pharmaceutical firm in Britain.

In the U.S.A. field trials last year 440,000 schoolchildren in forty-four States were vaccinated, the children receiving three injections of 1.0 ml. vaccine over a period of five weeks. About half as many were injected with 1.0 ml. of the uninfected culture fluid; a further 1,830,000 schoolchildren served as additional controls.[15] The final figures are not yet available, but Dr. Francis is reported to have stated that the vaccine had proved to be 80–90% effective in preventing paralytic poliomyelitis.[16]

Unquestionably this is a tremendous achievement and will become a landmark in preventive medicine. But at the same time it would be unfortunate if, in the first burst of enthusiasm, it was thought to be the final answer to poliomyelitis. Last year's trial established two main facts: the formolized vaccine was safe, and it produced an immune response. What has not been established yet, for obvious reasons, is the duration of the immunity. The question arises whether immunity produced in this way will interfere with reinfection, the natural method by which immunity is maintained, and, if not, how often booster inoculations will be necessary. The possibility of toxic effects from repeated injections with monkey tissue must be considered. Many problems on the general effect of formolized vaccine still remain unanswered, such as improved methods of preparation, quantitative assay, and the timing of vaccinations. At the same time research must go on with alternative

[1] *Manchester Guardian*, April 13, 1955.
[2] Boyd, T. E., *Bact. Rev.*, 1953, **17**, 339.
[3] *British Medical Journal*, 1952, **2**, 551.
[4] Ibid., 1954, **2**, 259.
[5] Enders, J. F., *et al.*, *Science*, 1949, **109**, 85.
[6] *Amer. J. Hyg.*, 1951, **54**, 191.
[7] Morgan, I. M., *J. Immunol.*, 1949, **62**, 301.
[8] Horstmann, D. M., *et al.*, *J. exp. Med.*, 1954, **99**, 355.
[9] Bodian, D., *Amer. J. Hyg.*, 1952, **55**, 414.
[10] Weller, T. H., *New Engl. J. Med.*, 1953, **249**, 186.
[11] Salk, J. E., *et al.*, *J. Amer. med. Ass.*, 1953, **151**, 1081.
[12] —— *et al.*, *Amer. J. publ. Hlth*, 1953, **43**, 1384.
[13] Ibid., 1954, **44**, 563.
[14] Farrell, H., *et al.*, *Canad. J. publ. Hlth*, 1953, **44**, 273.
[15] Information Sheet, National Fund for Poliomyelitis Research, Vincent Square, London, S.W.1.
[16] *New York Herald Tribune*, European edn., April 13, 1955.
[17] Sabin, A. B., *Amer. J. Dis. Child.*, 1953, **86**, 301.
[18] Cox, H. J., *British Medical Journal*, 1954, **2**, 259.
[19] *Figaro*, April 14, 1955.
[20] Haas, R., Keller, W., and Kikuth, W., *Dtsch. med. Wschr.*, 1955, **80**, 273.

methods of developing an attenuated poliomyelitis vaccine along the lines suggested by A. B. Sabin[17] and H. J. Cox.[18] P. Lépine, of the Pasteur Institute, Paris, has also developed a vaccine which is soon to be tested,[19] and a description of the vaccine manufactured by the Behringwerke in Marburg has already been published.[20]

These are some of the points being studied in Great Britain. In 1954 the Medical Research Council appointed a committee of experts to advise on laboratory research, and valuable assistance in this direction has been given by the National Fund for Poliomyelitis Research. Vaccination centres have been established in which the serological response in children will be studied. A number of vaccines will be used, including those produced in Britain, attention being paid to the immune response in children from different age groups, with variation in the timing of the three injections. A follow-up of some of these children will be made so that the antibody levels can be studied over a long period. These are important questions, well suited to British research methods; they should be answered before mass immunization is attempted.

HOSPITAL CROSS-INFECTION

Twice in the last twenty years a well-founded hope that the prevention of sepsis could be achieved has been disappointed. For some years the sulphonamides served well for not only the treatment but the prevention of haemolytic streptococcal infections, but during the war resistant strains began to appear on which these compounds had no effect. The advent of penicillin did indeed solve this particular problem, because the haemolytic streptococcus cannot develop resistance to this antibiotic, and has been so suppressed by its use that hospital epidemics of this infection are now almost unknown. It is remarkable that the once most dangerous form of communicable sepsis should now be the most trivial in its consequences if treated in any reasonable way. But penicillin was also confidently expected to deal equally effectively with staphylococci, and at first it did so: now it often fails for this purpose, as may most of the other antibiotics which have followed it. Staphylococci are among the most resourceful of all bacteria; they can acquire resistance to almost any chemotherapeutic agent, and they have a great capacity for epidemic spread and for prolonged survival in any closed environment.

After the use of penicillin had been general for some years it began to be recognized that strains resistant to it had become established in hospitals, and particularly in surgical and maternity units. A majority of the staff of such units became nasal carriers of a resistant strain, which was sometimes transmitted to patients, causing infections which were usually, but not always, of minor severity. So much more attention has been concentrated lately on this form of cross-infection than in the past that we may be seeing things which escaped attention before, but it is at least a tenable proposition that minor staphylococcal sepsis is actually commoner than it used to be, in spite both of antibiotics and of improved aseptic technique. This is the conclusion reached by Howe,[1] who gives figures for the incidence of sepsis, usually staphylococcal, in clean operation wounds in the general wards of the Massachusetts Memorial Hospital. Between 1949 and 1953 there was a steady rise from 1.99 to 7.22%, and Howe suggests that these resistant strains—a small and highly selected fraction of the staphylococcal population of ten or more years ago—may be endowed with an epidemic propensity greater than that of the sensitive strains whose place they have taken. Whether or not the increase in such infections is real and general, the situation as seen by anyone who has studied it certainly gives no grounds for complacency.

Two papers in this issue of the *Journal* present the problem as seen in each of the two types of clinical unit in which staphylococcal cross-infection has been most troublesome. Drs. P. N. Edmunds, T. F. Elias-Jones, J. O. Forfar, and C. L. Balf describe at page 990 an epidemiological study pursued in three maternity hospitals in Edinburgh, and in the domiciliary practice of midwifery in that city. Nasal and vaginal swabs were taken from mothers on admission and eight days later, and eye and umbilical swabs from infants on the fourth and eighth day respectively. Pathogenic staphylococci recovered from these sources and from nasal swabs from the nursing staff, of whom slightly over half were carriers, were submitted to sensitivity tests to antibiotics and to a sulphonamide. The results of these tests were the basis for subdividing staphylococci into types. Although this method is not ideal, it serves two purposes at once, and two strains with clearly different sensitivities must be different in identity: the converse, of course, is not necessarily true. The percentages of babies in hospital whose eyes and umbilical stumps yielded pathogenic staphylococci were 35 and 40 respectively. The corresponding figures for those born at home were only 5 and 8.6, despite the fact that these families were attended by nurses from one of the hospitals. The antibiotic resistance patterns of the hospital babies' staphylococci corresponded with

[1] *New Engl. J. Med.*, 1954, **251**, 411.

those in the nurses, and bore no relation to those of organisms from mothers. The mothers, indeed, seem to have played a singularly passive role; they usually neither acquired the prevalent organism nor communicated to their babies such staphylococci as they possessed themselves. Actual infections in babies were fairly frequent but of a minor nature. The authors do not mention breast infections in mothers—a more serious manifestation of this form of sepsis which may develop either in the ward or after the mother has left it. The conclusion that babies acquire their staphylococci directly or indirectly from nurses seems inescapable, and accords with the results of earlier studies. What we need to know is why more than half of the staff of such a unit so often become nasal carriers of a staphylococcus which is usually resistant to penicillin. No complete answer to this question has yet been given.

The same problem as it affects a surgical unit—and one doing specialized work in which the liability to sepsis is exceptionally high—is discussed in the paper by Dr. E. J. L. Lowbury in the opening pages of this issue. A series of different applications has been used successively in the Burns Unit of the Birmingham Accident Hospital for the prevention of staphylococcal sepsis. Penicillin failed owing to the appearance of resistant strains, as in turn did chlortetracycline and erythromycin, although each succeeded for a time. Dibromopropamidine and staphylococcal phage became useless for the same reason (the former was also locally toxic). The latest policy is to combine penicillin with another agent to which resistance is less readily developed, and the two chosen have been neomycin and "hibitane." Both combinations have greatly reduced the frequency of colonization of burns by staphylococci, and no strain resistant to either of the new agents has been recovered. Apparently resistance to hibitane cannot be induced, even *in vitro*: to neomycin it can, but the resistant variant is a small-colony form of reduced virulence which might well be eliminated *in vivo*. It is not clear how much of this success was attributable to the penicillin in the combined treatment, and the new agents might well be tried alone—as appears to have been contemplated—or themselves combined.

Dr. Lowbury also reviews at some length the general problem of the erection of barriers to the spread of bacteria in hospitals. There are several new methods available, mainly directed to air hygiene, and the positive pressure ventilation of operating theatres and of rooms used for dressings will no doubt come to be regarded as essential. Nevertheless "it is now common knowledge that the classical methods for controlling cross-infection—barrier nursing, cubicle isolation, aseptic techniques—are quite inadequate for the exclusion of resistant staphylococci from susceptible sites of hospital patients." If the deductions of Howe, quoted earlier, are correct, it is then indeed true that "the dilemma of hospital infection has been complicated rather than solved by chemotherapy."

MEASLES

The graphs of infectious diseases published in this *Journal* have recently been showing a weekly incidence in England and Wales of between twenty and thirty thousand cases of measles: deaths in the 160 great towns of England have numbered not more than one or two per week. The figures for deaths and the figures for cases are not derived from the same sources or areas and a death rate based on them would be inaccurate, but it is obvious that the present epidemic is one of very low mortality and very high infectivity. This has been the pattern of the disease during the sulphonamide and antibiotic era, and, if mortality alone were considered, it might be concluded that the disease is no longer of great importance. But, especially in younger children, the illness is still often very acute and recovery may depend on skilled nursing and powerful drugs.

The diagnosis of measles in the eruptive stage is usually easy: Koplik's spots are almost always still present on the first day of the rash and frequently on the second day too; their recognition ends all doubts when the rash is a little atypical. Sometimes the rash on the first day is quite discrete and the individual macules are small and pink. If the cervical glands are slightly enlarged, as they often are in measles, the resemblance to rubella is close, and failure to recognize Koplik's spots at this stage is a frequent cause of mistaken diagnosis. By the second day these rashes change to the florid semi-confluent dusky rashes of measles and the diagnosis becomes obvious. A less common cause of difficulty at this stage is the scanty coarse rash sometimes seen in the more "septic" types of scarlet fever: there is little evidence of punctation, the rash consisting of fairly large macules, scanty on the trunk but more numerous on the limbs, especially around the elbows and knees. The fauces in these cases are usually acutely inflamed and covered with exudate, the tongue is stripped, and the cervical glands are

enlarged and tender. The diagnosis can usually be made on careful clinical examination, but sometimes a white-cell count is necessary. A polymorph leucocytosis will be found in scarlet fever; in measles the count is nearer normal, with an increase in Türk cells and a decrease in small lymphocytes. Croup is a common symptom in the pre-eruptive stage of measles, when it is so desirable to diagnose and isolate the case: Koplik's spots can usually be seen and the disease diagnosed two or three days before the rash appears.

Bronchopneumonia is the commonest complication. Its presence can scarcely be missed, but it is often diagnosed when not present, especially in the first day or two of the rash. A child at this stage may have a temperature of 103–105° F. (39.4–40.6° C.) and there may be some moist sounds in the chest. But most cases of measles have moist sounds in the chest in the eruptive stage, and often the early, rather alarming temperature falls to normal within twenty-four hours without any treatment. A child with bronchopneumonia is a very distressed child, with grunting respiration, often a little cyanosed, frequently very restless, sometimes with slight neck stiffness, often with twitchings. It is desirable to try to make an accurate diagnosis in these cases, often not easy, rather than to administer antibiotics to every case with a high temperature and a few moist sounds. Most cases of measles recover with no specific treatment. Haemolytic streptococci are common causes of the bronchopneumonia of measles, and penicillin should always be given first: one injection of 100,000 units followed by oral doses of 300,000 units every four hours will give therapeutic serum levels. The routine use of penicillin to prevent complications of measles has been recommended, but careful observation of the individual patient is sounder and certainly more economic practice. In ward or institutional outbreaks, where cross-infection with secondary organisms may be expected, some such routine may be justified.

Otitis media is a fairly common complication of measles. It should be looked for with the auriscope and treated in the early stage with sulphonamides or penicillin, when it will usually resolve. Prophylaxis by routine drugs has been advocated for this complication too, but there is little to justify it. Enteritis occasionally accompanies the eruptive stage of the disease, especially in babies. It is usually non-specific in character and subsides in a day or two; no antibiotic treatment should be given unless the condition fails to settle, and only then if a specific organism is isolated. Encephalitis is the rarest and most serious complication: there is no specific therapy. Cortisone has been advocated, but no convincing results have been published. Gamma globulin has been given in large doses, but the results have been disappointing; nor has concentrated plasma injected intravenously given much benefit. The only reassuring feature is that often the prognosis is not so grave as the symptoms suggest, and apparently complete recovery may occur after several weeks of coma. Patients with the paralytic type, if they recover, usually do so completely.

Measles is an acute and sometimes a serious disease. The onset of complications should be detected by careful observation of the patient, and treatment prescribed early. Indiscriminate dosing with antibiotics for a disease capable of causing twenty thousand cases a week has nothing to recommend it.

HYPNOTISM

There will be a warm welcome among medical men and women for the report on the "Medical Use of Hypnotism" which was approved at last week's Council meeting of the British Medical Association (see *Supplement*, page 190). The subcommittee of the Psychological Medicine Group Committee of the B.M.A.—under the chairmanship of Professor T. Ferguson Rodger—is to be congratulated on producing not only a very readable report but also one which is much to the point. For the past hundred years there has been an abundance of evidence that psychological and physiological changes could be produced by hypnotism which were worth study on their own account, and also that such changes might be of great service in the treatment of patients. Nevertheless, the profession as a whole has kept aloof, and the feeling has persisted that hypnotism was not respectable. There were sufficient reasons why this should be so. The mechanism of hypnosis could not be satisfactorily explained by any current theory on either a psychological or a physiological basis, while the observations which could be made often partook of the startling and spectacular; the patients who would naturally be selected for hypnotic treatment would consist largely of those suffering from what were often regarded as "imaginary" ailments; the practitioners of the art included a large proportion of charlatans and showmen with whom medical men would dislike being associated; and, finally, the actual method of treatment seemed to entail an element of wilful deception—for example, in persuading the patient of something which was not yet true—which doctors would regard with some repugnance.

Nevertheless medical interest in hypnotism has returned again and again, especially when stimulated by the widespread occurrence of acute neurotic illness. Such a wave of interest developed after the first

world war, though not after the last war, presumably because other methods of treatment—such as continuous narcosis and drug-aided abreaction—served the same purpose as hypnotism. However, public recognition of the need to curb the use of hypnotism as a spectacle has once more turned the spotlight in that direction, and the B.M.A. properly decided that the time had come to redefine the medical attitude. If, as the subcommittee recommends, the use of hypnotism is to be confined to those who will be governed by medical standards and ethics, the way will be thrown open to doctors to give the subject the attention it deserves.

The report lays great stress on the need for research, and, first among the subheadings, mention is made of neurophysiological and psychological observation under controlled conditions. In the final paragraph it is recommended that work of this kind should be sponsored by university departments and research foundations. Both of these points are of cardinal importance. Hypnotism has its physiological and its psychological aspects, and its central problems lie in the nebulous and difficult border country between the two disciplinary fields. In its operation there appears to be an interaction of psyche and soma which it is impossible to explain, in any satisfying way, with the aid of current concepts. Fundamental scientific work will require, and will be likely to lead to, new ideas, which may well prove to be of a revolutionary kind. For these reasons it is greatly to be hoped that fully trained research workers will be attracted to the investigation of hypnotism, and that they will be provided with all the facilities they need. Work with animals, in which the phenomena of hypnotism can be observed in a relatively simple form, should not be neglected. It will only be when we know and understand a great deal more about hypnotism than we do now that we shall be able to make the best use of its therapeutic potentialities. Meanwhile, even with our present inadequate theoretical understanding, it should be fairly easy to carry out, as the report recommends, the statistical investigation of its uses in treatment. Anaesthesia is one of the most obvious and important fields of study; and another would be among such common though varied disorders as stammers and tics, migraine, disturbances of sleep, and so on. The report rightly rejects the idea of there being a special "gift" for hypnosis, but doctors will undoubtedly vary in their aptitude for this as for every other form of specialized work. Those who feel the call to use hypnotism in therapy, and have the opportunity to do so, will hardly object if scrutiny is made, by statistical methods, of the results they obtain.

In 1831 the French Royal Academy of Sciences affirmed their belief that with hypnotism a new field of physiological science had been opened up; and this view has now been reaffirmed. It is to be hoped that the scientists will at last make use of their opportunity, and find out just how much, or how little, this field contains.

THE DISEASED DISK

Clinical interest in the "disk syndrome" and the diagnosis of it have increased in recent years, yet it remains a subject of some mystery and unfamiliarity. We are told[1] that H. von Luschka observed posterior prolapse of the intervertebral disk so long ago as 1859, but it remained until G. Schmorl's detailed study[2] of the spine in routine necropsies in Dresden during 1927 to 1931 for any proper assessment of the nature and the frequency of pathological lesions in these structures. Schmorl's work, part of which was also described by O. A. Beadle in a Medical Research Council report,[3] established a number of different types of change in the contour of the intervertebral disk. When the bone tissue adjacent to its upper and lower surfaces becomes weakened, the disk tissue can expand diffusely, resulting in the "ballooned" intervertebral disk of advanced osteoporosis or osteomalacia. Under other—incompletely understood—circumstances, the nucleus pulposus may herniate through its fibrous capsule into the cancellous bone of the vetebral body; in fact in Schmorl's material this change (forming the lesions we now describe as "Schmorl's nodes") had occurred in 38% of adult spines. Finally, and of greatest clinical importance, posterior herniation of the nucleus pulposus into the spinal canal may occur. In Schmorl's series this posterior herniation was present in 15% of adult spines, and occurred most frequently in the lower dorsal and upper lumbar regions. These processes of diffuse expansion and herniation of the intervertebral disks result from the semi-fluid nature of the normal nucleus pulposus, the considerable compression to which these structures are subjected by the stresses of weight-bearing, and the osmotic factors[4] which are responsible for their residual turgescence under resting conditions. Although intervertebral disks can undergo certain degenerative changes, including calcification, it is of interest that they can become herniated without any histological abnormality being present—or even developing—in the herniated tissue.

While Schmorl's studies were progressing, clinical awareness was developing of the sensory and motor changes resulting from compression of nerve roots by the same posterior herniation of intervertebral disk tissue into the spinal canal. The accounts of W. E. Dandy[5] and of W. J. Mixter and J. S. Barr[6] were illuminating, though back in 1911 G. S. Middleton and J. H. Teacher[7] had described a case where paraplegia had resulted from "rupture" of an intervertebral disk during muscular effort. It became apparent that the

[1] Collins, D. H., *The Pathology of Articular and Spinal Diseases*, 1949, London.
[2] Schmorl, G., and Junghanns, H., *Die gesunde und kranke Wirbelsaule im Röntgenbild*, 1932, Leipzig.
[3] Beadle, O. A., *The Intervertebral Discs. Observations on their Normal and Morbid Anatomy in Relation to Certain Spinal Deformities, Spec. Rep. Ser. med. Res. Coun.* (*Lond.*), 1931, No. 161.
[4] Charnley, J., *J. Bone Jt Surg.*, 1951, **33**, 472.
[5] Dandy, W. E., *Arch. Surg.* (*Chicago*), 1929, **18**, 660.
[6] Mixter, W. J., and Barr, J. S., *New Engl. J. Med.*, 1934, **211**, 210.
[7] Middleton, G. S., and Teacher, J. H., *Glasg. med. J.*, 1911, **76**, 1.
[8] Stookey, B., *Arch. Surg.* (*Chicago*), 1940, **40**, 417.
[9] Armstrong, J. R., *Lumbar Disc Lesions*, 1952, Edinburgh and London.
[10] Spurling, R. G., *Lesions of the Lumbar Intervertebral Discs*, 1953, U.S.A.
[11] Mair, W. G. P., and Druckman, P., *Brain*, 1953, **76**, 70.

"cartilaginous" masses sometimes observed at operation in the spinal canal were prolapsed intervertebral disk tissue and not tumours, and that clinical symptoms of sciatica from nerve root compression were commonly produced by such lesions in the lower lumbar region. More recently it has become clear from the work of B. Stookey[8] and of others that symptoms referable to the arm and neck are occasionally produced by lesions in the cervical region of the spine. From the absence of clinical manifestations it would appear that the herniations observed by Schmorl and others in the dorsal and upper lumbar region do not usually produce nerve compression. The general accounts of J. R. Armstrong[9] and of R. G. Spurling[10] summarize the clinical aspects of the "lumbar disk syndrome" and discuss in some detail the problems of clinical recognition and treatment.

As to disk herniation in the cervical region, evidence has recently been brought forward in an important paper by W. G. P. Mair and P. Druckman[11] to confirm the idea that compression of the anterior spinal artery, with the secondary production of ischaemic damage in affected parts of the spinal cord, may play a large part in the production of symptoms. Such a mechanism is not possible in the lumbar region, where the clinically frequent sites of disk protrusion (L.4, L.5) are some distance caudal to the lower end of the spinal cord.

PORTAL VENOUS PRESSURE

By means of hepatic vein catheterization the portal venous pressure may be assessed indirectly. The technique is to block a hepatic vein by wedging the tip of the catheter into it and then to record the resulting pressure.[1] Investigations on man at laparotomy and on animals have shown that the pressure recorded in the blocked hepatic vein closely parallels that recorded directly in the portal vein.[2] The principle is similar to that used in assessing pulmonary venous pressure from measurements of the pressure in a blocked pulmonary arteriole—the so-called pulmonary capillary pressure.[3]

The pressure recorded in a blocked hepatic vein has been shown by this technique to be greater than normal in patients with cirrhosis of the liver, indicating the presence of portal hypertension.[4 5] By this technique also it is possible to distinguish between intrahepatic portal hypertension in portal cirrhosis and extrahepatic portal hypertension resulting from portal venous thrombosis or congenital vascular anomalies, since in the extrahepatic group the blocked hepatic venous pressure is not raised. When vascular surgery for the relief of portal hypertension is considered, this test may therefore be of practical value in confirming the diagnosis of portal hypertension and in distinguishing the site of portal venous obstruction. It may also help in assessing the efficacy of the shunt after porto-caval anastomosis has been performed, if catheterization repeated after operation shows a significant fall in portal venous pressure.

[1] Myers, J. D., and Taylor, W. J., *J. clin. Invest.*, 1951, **30**, 662.
[2] Friedman, E. W., and Weiner, R. S., *Amer. J. Physiol.*, 1951, **165**, 527.
[3] Hellems, H. K., *et al.*, ibid., 1948, **155**, 98.
[4] Paton, A., *et al.*, *Lancet*, 1953, **1**, 918.
[5] Myhre, J. R., *Acta med. scand.*, 1954, **150**, 281.

MEDICINE ON TELEVISION

As the honorary secretaries of B.M.A. Divisions well know, it requires prodigious efforts to gather together more than two or three dozen doctors at a local meeting. Whether they would turn out in greater number to watch medical television programmes in a closed circuit remains to be seen. Meanwhile, such "telecasts" in the U.S.A. and Canada are drawing audiences of 20,000 doctors and upwards. Last week, for instance, Dr. Thomas Francis, jun., and Dr. Jonas Salk spoke about the new poliomyelitis vaccine (see p. 1016) on a television programme sponsored by the National Foundation for Infantile Paralysis. In 63 cities in North America medical audiences—comprising, it is reported,[1] 54,000 doctors—met in halls specially equipped to receive the programme, which, being transmitted in a closed circuit, could not be picked up on ordinary domestic television screens. Earlier this year "two of the world's greatest medical extravaganzas"[2] had already been staged, the first on the management of coronary thrombosis and the second on the management and elimination of streptococcal infections. The importance attached to these programmes can be judged from the fact that the first—produced and sponsored by Smith, Kline, and French under the aegis of the American Medical Association and local and State medical societies—was introduced to the medical profession by the President of the United States. The second closed-circuit transmission was sponsored jointly by the American Academy of General Practice and Wyeth Laboratories. Presumably the three programmes already produced this year will be the forerunners of many more, and perhaps of similar programmes in Britain. Commenting on the value of these "ethereal pageants" (or "videclinics"), the *New England Journal of Medicine*[2] takes a cautious line and wonders whether the money might not be better spent on other educational needs. While there may be a place for the occasional "super" production designed for an audience of thousands of doctors, the small medical meeting, with its free and easy atmosphere and often keen discussion, is certainly not to be despised either for its educational or for its social advantages.

The Queen has approved the appointment of Professor G. W. Pickering as Regius Professor of Medicine at Oxford. Professor Pickering has been director of the medical unit at St. Mary's Hospital, London, since 1939, and he will take up his new appointment next year.

The Council of the British Medical Association has approved a proposal to award the Gold Medal of the Association to Sir Henry Simpson Newland, a past-president of the Royal Australasian College of Surgeons and of the Federal Council of the B.M.A. in Australia, in recognition of his outstanding services to the Association and to the profession.

[1] *Manchester Guardian*, April 16.
[2] *New Engl. J. Med.*, 1955, **252**, 407.

EMERGENCIES IN GENERAL PRACTICE

BARBITURATE AND ASPIRIN POISONING

BY

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AND

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The summons, "Come at once: Mr. Smith has poisoned himself," may be the prelude to a medical emergency. How to deal with it depends to a large extent on circumstances of time and place. For example, Mr. Smith is, in fact, an employee of a general hospital, and, being on duty when the incident occurred, he is already on his way to a well-staffed and well-equipped medical ward. On the other hand, Mr. Smith may be a crofter 20 miles from the doctor's house and 100 miles from the nearest hospital. Most cases of poisoning, however, are seen in town practices, and it is against this background that the general practitioner is called upon to deal with the emergency.

The management of such a patient is likely to make excessive demands on the time and resources of the doctor who has innumerable commitments. It is therefore in the best interests of all concerned that steps should be taken to have the patient removed to hospital if the journey is not likely to prejudice his chance of recovery. However, even if transfer is practicable, *the immediate treatment given by the general practitioner is infinitely more important than anything that can be done some hours later.*

If the patient survives it will often be because the doctor or the relatives did the right thing at the outset; if, in the hospital ward, elaborate methods of resuscitation are needed it may well be because the simple forms of treatment were neglected while the patient was still at home. The general management is the same in nearly all the common types of drug poisoning, including acute intoxication by barbiturates and aspirin.

Removal of the Poison

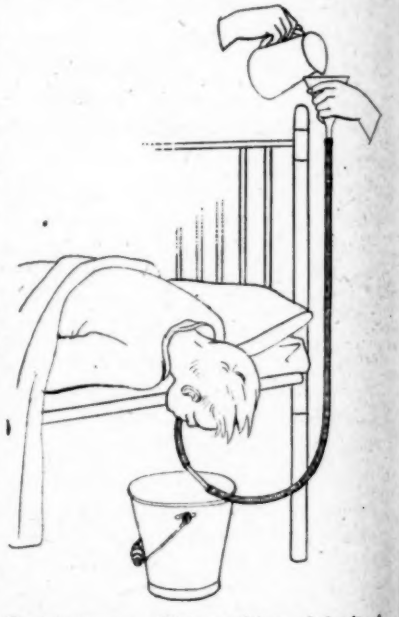
The relative who telephones for the doctor must be told how to give first aid. This consists in making the patient vomit. If the patient is conscious—even though drowsiness is developing—vomiting can nearly always be induced by boldly thrusting a finger down the patient's throat. The vomitus should be collected in a clean pail for examination later. After vomiting has occurred the patient should be made to drink two cupfuls of warm water and then digital stimulation of the fauces should be repeated. This simple procedure carried out three or four times is invaluable. It is much more rapid and reliable than the use of reflex emetics: among these are common salt (a dessertspoonful in a tumblerful of tepid water) and mustard (a teaspoonful mixed into a thin paste with cold water and then diluted with tepid water to make a tumblerful); ipecacuanha wine (tinct. ipecac. *B.P.*—a tablespoonful) is even less reliable, and salts of the heavy metals (copper sulphate, zinc sulphate, etc.) should not be used because they are likely to damage the stomach and may even poison the patient, especially when they fail to cause vomiting.

The most reliable of all the drugs used as emetics is apomorphine hydrochloride. It acts centrally, but it is apt to fail if the brain is depressed by narcotics and other drugs such as barbiturates and salicylates, and for this reason the administration of this drug to the comatose patient is a waste of time. On first seeing the patient the doctor will decide whether it is worth while to give apomorphine. If there is reasonable likelihood of success—as judged by the degree of consciousness and the state of the corneal reflex—a dose of 6 mg. (1/10 gr.) should be given intravenously at once. It usually acts within two minutes, but if given subcutaneously it may take five minutes. Emesis is more likely to occur if the patient is sitting or standing, rather than lying down (B. Isaacs, personal communication). Occasionally circulatory collapse occurs following the use of apomorphine. Further, when vomiting is induced in a patient already ill from poisoning, special care is needed to prevent aspiration of vomitus. These, however, are hazards which must be accepted when dealing with this kind of emergency.

No matter what may be the outcome of treatment with emetics the stomach must be washed out. And even when it seems virtually certain that the poison has passed into the intestine gastric lavage should not be omitted; experience shows that when suicide is attempted by rapidly swallowing a large number of tablets, many of them may become impacted at the lower end of the oesophagus and remain there until they are removed by the physician—or by the pathologist at necropsy.

Gastric Lavage

It is reasonable to assume that when the general practitioner accepts responsibility for the treatment of a patient suffering from poisoning he has had considerable experience of the routine procedure of washing out the stomach. The stomach tube proper (not to be confused with Ryle's tube), the glass connexion, the main length of rubber tubing, and the funnel are shown in the diagram. The total length of tubing should be about 5 ft. (1.5 m.) and its diameter rather less than ½ in. (1 cm.). There should be two or three apertures in the side of the tube near the tip to minimize the risk of blocking by debris in the stomach. A suitable funnel which is readily available has a diameter of 4½ in. (11.5 cm.). If the stomach tube is first dipped into water no other lubrication will be needed. The rounded end of the



Gastric lavage. Note position of the head.

tube is guided to the back of the pharynx, taking care to avoid the trachea, and is passed down the oesophagus. It is convenient to mark the tube 20 in. (50 cm.) from the tip: when this mark passes the lips it may be assumed that the free end of the tube is lying in the stomach an inch or two beyond the cardiac orifice. The doctor's poisons bag should also contain a smaller stomach tube and accessories suitable for use in children. The prone position of the patient minimizes the risk of inhalation of gastric contents in the event of regurgitation of fluid alongside the tube. About one gallon (4.5 litres) of tepid water is needed for lavage. In cases of barbiturate poisoning sodium bicarbonate should *not* be used, as it promotes conversion of insoluble barbiturates to their soluble sodium salts. The stomach is emptied repeatedly by siphonage. Not more than half a pint (300 ml.) should be poured into the funnel at a time, because large volumes of fluid rapidly entering the stomach tend to drive the gastric contents through the pylorus. The washings should be set aside for analysis. The biochemist's problem is made easier if the *first few ounces* of the vomitus or stomach washings is kept separate for examination; the rest of the material—much more bulky and dilute—can be sent in a separate vessel.

Before withdrawing the tube a solution of magnesium sulphate (two tablespoonfuls of the crystals in half a pint (300 ml.) of warm water) should be run into the stomach and left there. This hinders the absorption of water from the intestine, and if the toxaemia has not resulted in intestinal stasis a liquid motion may be passed within a couple of hours; bowel activity can be further assisted by giving a simple enema. Drastic purgation is undesirable because it exposes the patient to the hazards of dehydration; and where easily absorbed drugs are concerned purgation is unlikely to be an important method of elimination after the first few hours have elapsed.

General Supportive Measures

Once the poison has entered the body tissues there is little or nothing to be done to prevent its characteristic action. Nevertheless, much remains to be done for the unconscious patient: he requires food and water, otherwise there will be serious metabolic complications; he must be protected from bacteria which are capable of invading many parts of the body; and he must be saved, if possible, from the dangers which threaten life when the vital centres in the medulla are depressed, with consequent respiratory failure and signs of anoxia, and cardiovascular paresis with falling blood pressure. The services of experienced nurses are indispensable: the hygiene of the mouth, the skin, and the bladder calls for special care, and charting of all treatment is highly desirable. Recognition of these requirements underlines the importance of early admission to hospital. When this is impossible, the general practitioner is obliged to make such arrangements as may be practicable to provide some of the amenities of a hospital. The problems are complex, and in trying to solve them the close collaboration of the district nurse, the medical officer of health, and the ambulance service will be invaluable.

Four or five pints (2.5 litres) of fluid may be required daily. The intragastric drip is the best method for giving fluid and nourishment. With the patient in the supine position a Ryle's tube, lubricated with water, is directed into one nostril, pointing the tip backwards but not upwards. If it passes down the oesophagus, then when the single mark on the tube reaches the nostril the free end should be in the stomach. A few drops of water are passed through the tube to exclude the possibility that it is lying in the respiratory tract. After administering milk or other fluids the tube should be occluded with a spring clip, pressure forceps, or spigot and fixed to the side of the face with adhesive tape. If, however, intra-gastric administration is impracticable, fluid should be given parenterally—glucose solution (5%) or 5% glucose in normal saline intravenously. Water can be given by rectal drip. This method, however, is not unreservedly recommended: trouble may arise from blocking of the tube, or it may be pulled out inadvertently while the patient is being moved in the course of routine nursing care.

The daily intake of fluid varies according to such factors as the degree of dehydration and the activity of the skin, but the amount should suffice to ensure an adequate daily output of urine (say 1.5 litres). The onset of infection, especially at the bases of the lungs, must be anticipated by giving soluble penicillin intramuscularly—500,000 units followed by 100,000 units six-hourly. Incontinence of urine is inevitable and calls for the insertion of a self-retaining catheter; infection of the urinary tract, which almost invariably supervenes, necessitates the prophylactic administration of small doses of a sulphonamide—sulphadimidine 0.5 g. four-hourly injected through gastric drip tube.

Barbiturate Poisoning

In barbiturate poisoning respiratory failure is the chief danger. Serious prognostic signs are profound coma and the absence of poison in the gastric washings. Also, there may have been long delay in starting treatment. In such cases respiratory failure is almost certain to occur and this provides an urgent indication for transfer to hospital. The doctor should travel in the ambulance with the patient and be prepared to give artificial respiration *en route* if necessary. He should never leave the patient until his colleagues in the hospital have assumed responsibility; this is important, because in barbiturate poisoning respiratory failure often comes on *suddenly*.

In hospital the anaesthetist should be invited to supervise oxygen therapy and prepare appropriate apparatus to maintain a free airway and a satisfactory respiratory rhythm. Oxygen should be given without waiting for signs of anoxaemia, such as cyanosis of the extremities and the lobes of the ears. It is best administered by means of the B.L.B. mask or a special polythene bag at the rate of 6 to 8 litres a minute. If breathing becomes shallow artificial respiration must be started at once. The choice of method lies with the anaesthetist: bag ventilation of the lungs may be achieved manually or by a machine which ensures mechanical compression of the bag. The circumstances may warrant transferring the patient to the Drinker respirator and calling on a specially trained nursing staff. Artificial respiration and adequate oxygenation may maintain life until most of the barbiturate in the tissues has been either excreted or destroyed. The patient then gradually emerges from coma and normal breathing is resumed.

This phase of treatment, however, can often be shortened by giving analeptics. The two drugs most widely used are amphetamine sulphate and picrotoxin. *Amphetamine sulphate* is a safer drug than picrotoxin. The initial dose is 50 mg. intravenously, and this may be repeated after one hour if there is no obvious improvement—judged by recovery of the corneal reflex. If recovery is incomplete further doses of 25 mg. are given hourly. In severe cases a *total* dosage of 0.5 to 1 g. is not unusual. *Picrotoxin* is injected intravenously in 0.3% aqueous solution. The initial dose is 6 mg. (2 ml.), and this is followed by doses of 3 mg. (1 ml.) every three minutes until there is evidence of return of consciousness; but administration should not be pursued after *slight* twitching of the muscles occurs—for example, flickering of the eyelids. At this point caution is indicated: no more should be given for about 15 minutes, and then only if the twitching has ceased and the patient is relapsing into coma. If too much is injected there is a risk of causing convulsions, and these may be so persistent that intravenous injection of sodium thiopentone (0.1 to 0.5 g.) may be required to control them.

Interesting reports* have recently appeared on the actions of a new barbiturate antagonist called "NP 13" (β β-methylethylglutarimide), but it would be premature at the moment to offer an assessment of its value in general practice.

*Shaw, F. H., Simon, S. E., Cass, N., Shulman, A., Austee, J. R., and Nelson, E. R. (1954). *Nature (Lond.)*, **174**, 402. Harris, T. A. B. (1955). *Lancet*, **1**, 181.

Aspirin Poisoning

The toxicity of aspirin is much less than that of the barbiturates. If the patient's stomach can be washed out within an hour of his swallowing the tablets the chances of serious constitutional upset are negligible. Absorption of a large quantity of aspirin usually produces an acidotic state with noisy hyperpnoea. This is easily identified as a sign of acute salicylism because of the other characteristic manifestations—tinnitus, deafness, congestion of the skin, sweating, mental confusion, and muscular twitchings.

The acidosis of aspirin poisoning is best treated by giving Ringer-lactate solution *B.P.* intravenously. One pint (570 ml.) can be given in the first hour, a second pint in the next two hours, and thereafter one pint every four hours. This relieves the acidosis without exposing the patient to the risk of developing alkalosis. At the same time, if the patient is co-operative and can tolerate fluids by mouth he should be encouraged to drink water, tea, and coffee. Two teaspoonfuls of baking soda, in divided doses, can be given during the first two or three hours of treatment.

Next article on Emergencies in General Practice.—"The Bleeder," by Dr. R. G. Macfarlane.

Refresher Course Books.—Copies of the first two volumes of collected articles from the Refresher Course for General Practitioners published in the *Journal* are still available at 25s. (postage 1s.) each. The first volume contains 55 articles and the second 60. Each article has been revised and brought up to date by its author.

These books may be obtained from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1, or through any bookseller.

THE FUNCTION OF HISTAMINE

REPORT OF A SYMPOSIUM IN LONDON

On April 6 and 7 the Ciba Foundation held a symposium on histamine in honour of Sir Henry Dale, O.M., F.R.S., whose work with Laidlaw, and later Richards, laid the foundations of our knowledge of this substance. In conjunction with this symposium, on the preceding two days, April 4 and 5, the Physiological Society and the British Pharmacological Society held another symposium on histamine. This was at the Wellcome Foundation, London, and our correspondent's impressions of it are given below.

[FROM A SPECIAL CORRESPONDENT]

What is the function of histamine in man? No doubt the desire to find this out was one of the main reasons for the large attendance of scientists of different disciplines and from various countries at the recent symposium in London, arranged by the Physiological Society and the British Pharmacological Society.

Gastric Secretion

However, it is likely that most of the scientists were disappointed in their quest, for only C. F. CODE (Rochester) had sufficient of both knowledge and courage to claim for histamine a definite role in normal bodily function and to defend his claim against considerable criticism. Code holds that histamine is the normal direct stimulus for the secretion of gastric juice, and that all other stimuli—nervous or humoral—exert their effect by activating this histamine mechanism. His case is based on the local high concentrations of histamine found in the stomach and duodenum, on the presence of histamine in gastric juice in amounts closely correlated to the volume and acidity of the juice itself, and, of course, on the fact that injected histamine provokes gastric secretion. Support for Code's conclusions was also to be found in the comments of R. A. GREGORY (Liverpool), who has shown that histamine potentiators will increase gastric secretion in response to a number of different stimuli.

Nerve Transmission and Vasomotor Control

No other definite claim for a physiological function of histamine was put forward. There was, on the other hand, quite a lot of evidence about what histamine does not do. U. S. VON EULER (Stockholm) drew attention to the large amounts of histamine found in some peripheral nerves, especially in post-ganglionic sympathetic nerves (adrenergic), but no explanation for its presence there was offered. Section of such nerves is followed sometimes, though not always, by a reduction in the histamine content of the organ they supply; but no experiments on the effect of tetanic stimulation of these nerves on their histamine content have been carried out. One is consequently unable to judge whether the histamine is actually present in the nerve fibres themselves or not, and, if it is so located, whether it plays a part in nervous transmission. R. F. WHELAN (Belfast), from studies of blood-flow under a variety of experimental conditions, came to the conclusion—based solely on evidence of resistance to block by antihistamines (always a doubtful criterion)—that there is no evidence that histamine plays any part in vasomotor control.

Allergy and Anaphylaxis

W. L. M. PERRY (London) discussed the role of histamine in skin allergies and thought that histamine was not involved in the direct pathway leading from the antigen-antibody reaction to the skin lesion. He suggested, however, that the fraction of skin histamine located in mast cells might have a defensive action in causing oedema and thus diluting and washing out foreign materials; and that the fact that large amounts of histamine in mast cells are found in the skins of only those animal species which do not easily form fixed-tissue antibodies in the skin might be because this histamine is a substitute for the antibody defence mechanism.

H. O. SCHILD (London) reviewed the role of histamine in anaphylaxis. Large amounts of histamine are known to be released during an anaphylactic reaction, both *in vivo* and *in vitro*; but Schild pointed out that other substances are also formed. This point was taken up by several others, notably by D. F. HAWKINS (London), who showed that, in anaphylaxis in the isolated smooth muscle of bronchi, a slow-reacting substance is released as well as histamine; and by W. E. BROCKLEHURST (London), whose demonstration of the release by the specific antigen of a similar substance from both sensitized guinea-pig lung and from human asthmatic lung was coupled with evidence of its power to contract human bronchial muscle. All these contributions suggest that histamine may not be the most important or the most direct cause of the symptoms of anaphylaxis and allergy in man; and Brocklehurst's work especially may have considerable importance in our understanding of the nature of asthma and the well-known failure of antihistamines in the treatment and prevention of asthmatic attacks.

Thus, on balance, there was a general concurrence of opinion that histamine is of less importance than previously thought in anaphylaxis and in allergies of various kinds; and that there is as yet no evidence that it has any physiological function in the peripheral nervous or vascular systems—a depressingly negative series of conclusions.

Patterns of Histamine Distribution

We may not have much idea why histamine is present in the body; we may know only an increasing number of things with which it appears to have little to do; we do know, however, a very considerable amount about where it is, how it gets there, and how it is released and excreted.

and it was in dealing with these aspects of the problem that this symposium was most successful. W. FELDBERG (London), in an opening review of the distribution of histamine in various species and various tissues, brought vague impression to vivid realization of the almost incredible diversity in the patterns of histamine distribution. Why should rabbit liver contain twenty or more times the concentration of histamine found in guinea-pig liver? Why should ox lung contain ten times more histamine than rat lung? Why should there be a high local concentration of histamine in the skin of the ear, nose, feet, and nipples of the guinea-pig? And why should rat skin have more than ten times the histamine content of guinea-pig skin? These are the questions that come spontaneously to mind, bringing with them no clear answer. Nearly all tissues contain some histamine, and the universal presence of small amounts does not occasion much speculation; its formation may well be associated with the metabolism of all types of cell. It is the strikingly high local concentrations, varying in locality from species to species, that cry out for a teleological explanation.

Role of the Mast Cell

G. B. WEST (Dundee) reminded us of the role of the mast cell. His work with Riley has established the extraordinary concentration of histamine in those cells (1 in 1,000 or more). Riley and West have demonstrated convincing correlations between tissue contents of histamine and of mast cells respectively, and offer this as one major factor in accounting for the diversity in histamine distribution. But, so long as the function of the mast cells themselves remains obscure, acceptance of these workers' views does not help in deciding the functional significance of the diversity. F. C. MACINTOSH (Montreal) continued the story of the location of histamine in the mast cells by reviewing the evidence which suggests that histamine is held in their characteristic metachromatic granules. These granules, which behave in many respects like mitochondria, can be separated by differential centrifugation, and histamine can be released from them by a variety of physiological and chemical stimuli, but not by specific antigens.

Since antigen-antibody reactions almost certainly do liberate histamine from intact mast cells, as pointed out for skin by W. L. M. PERRY, it may be that such reactions produce a change at the membrane of the mast cell, this change being responsible for the release of histamine from the granules. A similar mechanism for the release of histamine was postulated by B. N. HALPERN (Paris) to account for the action of the large-molecule histamine liberators (dextran and polyvinyl-pyrrolidine) which must produce their effects without entering tissue cells, the membrane of which would be wholly impermeable to them.

W. T. BERALDO (São Paulo) produced further evidence of the correlation between mast cell populations in tissues and their histamine contents before and after depletion by histamine liberators. He found one striking discrepancy, however, in the high local concentration of histamine found in the stomach and duodenum of the rat; this histamine is not released by histamine liberators and there are few mast cells in this region. It might be reasonable to suppose that this particular histamine is specifically concerned with gastric secretion.

Release of Histamine

W. D. M. PATON (London) reviewed the various classes of substance which release histamine and discussed possible mechanisms by which they might act. The list of substances known to release histamine is now formidable, and includes, apart from specific antigens, compounds which cause tissue damage, proteolytic enzymes, surface-active agents, large molecular compounds such as dextran, and dibasic and monobasic histamine liberators. J. L. MONGAR (London) described the various ways in which histamine-releasing activity can be estimated, and in this connexion H. O. J. COLLIER (London) put forward some evidence to suggest that, in screening drugs for subsequent use in man, it is safer to test for histamine liberation by intradermal injection into a human volunteer than to rely on laboratory tests on animals.

M. ROCHA E SILVA (São Paulo) discussed the release of histamine by naturally occurring substances. He reviewed current thinking about anaphylatoxin and discussed the release of histamine by trypsin.

The whole question of the method or methods of release proved a controversial one. On the one hand, G. UNGAR (New York) presented his recent work on the activation of proteases by the antigen-antibody reaction, the resulting proteolytic activity going in parallel with histamine release, and C. G. HAINING (Birmingham) found that histamine release by dextran sulphate also ran parallel to protease activation. On the other hand, F. C. MCINTIRE (Chicago) pointed out that most tissue histamine could be released by boiling water, and all of it by cold extraction with basic lead acetate; trypsin did not release any additional histamine. McIntire considers that this is proof that the binding of histamine must be relatively loose and that the proteolytic activity cannot be necessary for its release. In view of the diversity of tissues and species which served as test objects this controversy may well be one of those in which there is much to be said on both sides.

Destruction of Histamine in the Body

The fate of histamine was another subject which provoked some controversial opinions. R. W. SCHAYER (Chicago), in reviewing his own recent and elegant experimental results, obtained using C^{14}-labelled histidine, showed that histamine is excreted in three forms. The first of them, he suggests, is the result of breakdown of histamine by diamino-oxidase to the riboside of imidazole acetic acid; the second, the result of breakdown by an unknown methylating enzyme, is methylimidazole acetic acid; and the third is free histamine mixed, perhaps, with N-methyl histamine. J. H. GADDUM (Edinburgh) disposed of acetylhistamine, found in the urine sometimes in considerable quantities, as being of importance only in so far as it confused the picture of histamine metabolism as a whole.

G. KAHLSON (Lund) discussed the significance of histaminase in the body, and among other matters suggested that the exceptionally high histaminase content of the placenta is a defence mechanism to protect both the uterus and the foetus from histamine produced by the mother. E. A. ZELLER (Chicago) mentioned difficulties encountered in the nomenclature of the histamine-destroying enzymes, criticizing that used by R. KAPELLER-ADLER (Edinburgh), who did not, however, rise to the bait but dealt instead with the potentiating effect of oestrogens on histaminase activity, suggesting that determination of the latter might serve as a useful clinical test for hormonal imbalance in pregnancy.

Conclusion

One left with the feeling that, although there are still few known physiological functions of histamine, we are beginning to have a clearer idea of its dynamics and that perhaps further clarity in this respect may help to solve the teleological problem.

Sir HENRY DALE, who presided over the final session, confessed to embarrassment that a chance observation many years previously should have had such influence on the interests and endeavours of so many people. Few would agree that he has cause for embarrassment. All who attended must be grateful to him and to Dr. W. FELDBERG and Professor F. C. MACINTOSH, the chairmen of the two other sessions; to the Physiological Society and the British Pharmacological Society, who organized the symposium; and to the Wellcome Foundation, our most hospitable hosts for the occasion.

MEDICAL ASPECTS OF ATHLETICS

A meeting of the Harveian Society of London, with Mr. A. DICKSON WRIGHT presiding, was held on April 13 for a discussion on the medical aspects of athletics.

The Role of the Doctor

Sir ADOLPHE ABRAHAMS said that the criticism was made that the doctor could not be much of an authority on athletics because his preoccupation was with diseased not with healthy people. Superficially that was true, but only superficially. The doctor had played a great part in athletic training; he had rescued it from its extraordinary former state when athletes were advised to eat huge quantities of half-raw meat and to reduce their liquid consumption until they became dehydrated. As for injuries in athletics, in major injuries the general principles of surgery obtained, but minor injuries were a different matter. The athlete regarded himself as a privileged person. The ordinary patient might be satisfied to get away with a 10% disability, but the athlete expected complete restoration and in the shortest time. On the medical side much was said formerly about the dangers which schoolboys incurred by strenuous exercise and about the "athlete's heart." To-day he doubted whether any authority would agree that there was such a thing as a "strained heart" in the case of a healthy heart. A word should be said in warning against taking any violent exercise while in a pyrexial condition. In the case of poliomyelitis the danger was serious. All vital processes were affected by a rise in temperature—an engine worked best when hot—but there were dangers above a certain temperature limit. He had always protested against marathon races being run in the heat of the day.

In conclusion he paid a tribute to the work of British physiologists. Nearly 40 years ago Professor F. A. Bainbridge wrote his book on *The Physiology of Muscular Exercise*. It had been re-written and edited by others since then, but the basic principles there set out remained for all time. Such names as Joseph Barcroft, Martin Flack, A. V. Hill, and many others proved that this country was a pioneer in this field.

The Needs of the Runner

Dr. ROGER BANNISTER declared that athletes were essentially hypochondriacs, almost superstitious about health, and likely to consider themselves and their training methods much too seriously. These matters had been dealt with empirically in the past, and he did not think that physiology had yet got to the state at which it could make accurate predictions of a man's achievements. Dr. Bannister went on to speak in detail of three types of runners—the sprinter, the middle-distance runner, and the marathon runner. The sprinter was in a situation in which he was unable to make full use of the existing supplies of oxygen in the air, and was dependent on the extent of his lactic acid tolerance. His speed of movement was limited also by muscle viscosity, an innate property which could be influenced little, if at all, by training. The sprinter could by taking thought improve by a fraction his starting time and bring about an improved tolerance to some extent by practice, but an improvement of, say, 1% in his performance would barely be reflected in present methods of timing.

With middle-distance runners the problem was different. They could greatly improve their oxygen uptake by training. The oxygen uptake depended on many factors: cardiac output, ventilation rate, speed of diffusion in the lung, and the rate of oxygen uptake in the muscles themselves. If it were made possible for such a runner to breathe a higher percentage of oxygen there was no doubt that all distance records would be broken. Dr. Bannister showed diagrammatic curves which had been worked out to illustrate, in the example given, how subjects breathing ordinary air reached breaking point within six or eight minutes, whereas others, subjected to the same strain but breathing a higher percentage of oxygen, were able to carry on for 16 minutes, and in some cases much longer. Whether it was practicable to breathe oxygen in high concentrations while running a race it was difficult to say. If it were, no middle-distance records would be beyond the runner's grasp, but whether this was desirable in what was after all only a sport was highly questionable.

The same phenomenon of oxygen lack was met with in mountain climbers, although there, of course, the trouble arose from deficiency of oxygen in the outside air. But in climbers at altitude the same mental changes and changes in vision and consciousness occurred as in distance runners. The problem of the distance runner was one of distribution of effort with a view to maximum economy. At certain parts of the race he might save oxygen and use it advantageously at others. As for the marathon runner, here the essential limiting factor might be not oxygen uptake but exhaustion of the carbohydrate reserves of the body. In conclusion Dr. Bannister said that the various physiological studies were undoubtedly a help to athletics, but the main thing was the athlete's enjoyment of his performance irrespective of the standard.

Dangerous Games

Sir ARTHUR PORRITT said that sport and medicine had always been linked together even from distant times, as was suggested by such hackneyed phrases as *Mens sana in corpore sano*. The problem of medicine in athletics was twofold. There was first the therapeutic problem, which had both its physical and its psychological components, and then the research problem, which was immensely stimulating. How many athletes in that company when running had had a "stitch," and who could explain it? What was the position of young women in regard to athletics from the gynaecological point of view? These and many other questions remained. In view of the number of people in this country who went in for some form of sport, sport medicine was as much a social service as industrial medicine. One had only to think of the vast number of work days and school days lost owing to injuries sustained in playing games. But the only people who took an interest in such matters were the insurance companies.

Games from the point of view of liability to injury fell into three categories: hazardous, medium risky, and safe. The most hazardous was rugby, 10% of whose players received injuries; the corresponding figure in soccer was 8%. Other hazardous sports were polo and lacrosse. Medium-risk sports included boxing and hockey. Safe sports were swimming, athletics, golf, tennis, and so forth, in which the players did not come into bodily contact. Sir Arthur Porritt concluded his remarks by describing the varied work of the sports doctor.

HUMAN REACTIONS TO DANGER

In an address to the Alfred Adler Medical Society on April 7 in London, Professor ALEXANDER KENNEDY, President of the Society, spoke on "Human Reactions to Danger." He described his observations on the effects of training on individuals already known to be capable of efficient performance under conditions of danger and stress, and their actual responses in the field.

It was always the hope of Science, he said, after the initial period of observation and record, to reduce a problem to as simple a form as possible and to put any preliminary conclusions to the test of experiment. Situations involving fear and danger were of particular interest to

Adlerians, as they represented the struggle to adapt to circumstance in its simplest form. In observing the natural experiments seen in time of war or where man chose to pit himself against the forces of nature in sport and in the pursuit of knowledge, it was essential to record events as they occurred, and not in terms of any preconceived theory. In studying psychological reactions and the subjective aspects of physiological changes it was necessary to minimize the effects of interpretation on the part both of the observed and of the observer. The hesitation to discuss fear and personal aims in warfare was at least as great as the inhibitions about descriptions of sexual matters in the normal citizen. In the constitutionally well-endowed, operating at their peak of efficiency, however, stress sometimes produced clear insights which were expressed in almost poetic language. The accounts given by trained observers of their own sensations and thoughts under stress were of value, if they retained their objectivity.

Professor Kennedy said that his work was based on the behaviour of individuals who had been examined in some detail previously, when not under stress. While most of the observations were made in time of war, he had found that the observation of athletes in training for major events also contributed useful material.

Survival Value of Fear

The general concept of danger and the emotion of fear had survival value. Foolhardiness was as pathological as neurotic breakdown. Individuals varied very greatly in their capacity to realize their full potential under stress, whether this was a matter of making the instantaneous decisions necessary in combat, or of straining the organism to a calculated degree of cardiac decompensation in athletics. Certain short-term mental mechanisms were employed to ensure, firstly that the individual prepared himself for danger, and secondly that under stress he simplified his mental operations in the interests of efficiency. Many of the features of breakdown showed as inefficient caricatures of these protective mechanisms.

The response to danger was a psychosomatic one in which the whole organism was involved, and variations in the individual response to the same situation were dependent on the previous make-up and on the efficiency of preparation. In both spheres there were *alarm* or short-term reactions and *training* or long-term reactions. Cannon had shown the way to understanding the immediate physiological responses, and Selye's work had great bearing on training and the building up of resistance to stress.

Professor Kennedy said that his own results indicated that the psychological responses showed a similar division into emergency and training responses. "Wind-up" or tension served a useful preparatory purpose, as did the mental mechanisms which concentrated the attention on essentials and allowed calculated risks to be taken instantly and without retrospect. He gave illustrations of the purpose of diversion, humour, anger, loyalty, and the reversion to simple and almost childish values in the interests of efficiency at the critical moments, and of the great vulnerability of the highly trained if compensatory mechanisms were upset by the unexpected. He also described the effects of drugs such as adrenaline, noradrenaline, amphetamines, and A.C.T.H. on the alarm and training reactions. Their actions had thrown a great deal of light on the optimum length of training as opposed to practice, on staleness in athletes, and on the relative place of thought and effort in preparation for stress.

Very simple theoretical conclusions could be drawn from these observations which, he thought, had a bearing on the more complicated stresses of adaptation to life and work in a civilized community. They might be of assistance in understanding the ways in which normal individuals adapted themselves to less acute stresses and how that adaptation might be threatened.

THE DOCTOR'S APPROACH TO PAINTING

EXHIBITION OF THE MEDICAL ART SOCIETY

A professional artist reviews below the thirteenth exhibition of paintings and drawings by members of the Medical Art Society.*

This year's exhibition at Walker's Galleries shows the high standard of the Medical Art Society. The Society consists entirely of doctors who are also amateur painters, and it is interesting to see how painting is for them an escape from their daily lives. For instance, their professional life is largely concerned with people; yet these are almost wholly absent from the paintings. The subjects are generally remote rural scenes or deserted seascapes. Doctors work in houses or hospitals, but these pictures are mainly painted in the open air. There are few concerned with the objects and places of the doctor's work.

In general the paintings are objective and cheerful impressions of places visited in moments of relaxation. There is no hint of the anxieties of the everyday life of the doctor. This is strange, for the professional painter is often attracted to hospitals for material. Barbara Hepworth, for example, exhibited recently a collection of drawings of operations; and most painters are constantly using their immediate surroundings and the people near them as subjects for pictures.

As a profession, doctors have eyes trained to observe detail carefully, active and cultivated minds, and hands sensitive and deft. This is apparent in the paintings. The materials, whether oil, pastel, or water-colour, are skilfully handled; and observation is acute. Compositions are also well-planned, space and depth being admirably suggested.

Another interesting feature of the exhibition is that there is no apparent sign of influence by the dominant figures of contemporary painting. There seems to be no interest in the sources where Picasso and Klee, Sutherland and Moore, find their inspiration. The Medical Art Society seem to be escaping from the Atom Age and space travel in the same way as they are escaping from their clinics and operating theatres. This is not a wholly bad state, as it leaves the painter an open mind to record the facts in front of him without striving to fit them into a preconceived idiom—a fault so often found in the professional student of painting.

Landscapes and Still Life

The work in this exhibition is mostly a personal record of places, things, and people seen by the painter. Only occasionally is an echo of another painter's work to be found in such a picture as No. 37 by R. A. BEAVER (London), which reminds one a little of the work of Lowry, though Lowry's paintings have Midland industrial areas as their settings. R. A. Beaver has admirably adapted the style to portray a particular part of London. His other painting, *Cold Hampstead*, though different in style, also achieves this. Both are most interesting compositions.

No. 47, *Station Approach*, by A. B. HEWLETT (London), is also a painting that reminds one of another artist, in this case Charles Ginner, and the influence may be quite unconscious. The meticulous observation used by both painters excludes a feeling of light and shade and heightens the grey leaden atmosphere of this very English scene. To capture the character and "feel" of a particular scene is surely the object of all landscape painting; Claude and Turner were both masters in this way. A show of virtuosity in painting windswept clouds and sea foam can never compensate for a lack of atmosphere. That is why *South Downs*, No. 172, by R. OGIER WARD (London), is a good painting; it achieves the character of a particular place at a particular time and in this contains more than others which are executed with greater skill. Another painting

* The exhibition is on show at Walker's Galleries, 118, New Bond Street, London, until April 30 (hours 10 a.m. to 5 p.m.; Saturdays 10 a.m. to 1 p.m.).

which successfully creates a quite different atmosphere is No. 22, *Forteleza de Sao Joao de Estoril*. FRANK FORTY (London) has achieved this by precisely opposite means to those used by A. B. Hewlett in No. 47. By selecting the minimum of shapes and colours and presenting them with complete simplicity, he obtains a feeling of sunlight and immense heat.

Three modest but successful landscapes are No. 43, *Amalfi*, and No. 52, *Yarmouth, Isle of Wight*, by D. N. MATTHEWS (London), and No. 65, *Barges on a Canal*, by C. VER HEYDEN DE LANCEY (Jersey). In No. 52 it is interesting to see how the painter has taken a mass of small boats and a large area of landscape and reduced them to a beautifully ordered composition.

The few still lifes differed greatly in character. No. 56, by NORMAN ASHTON (London), has its roots in Flemish painting. It shows an interest in the surface qualities of the different objects, which are skilfully represented. The cabbage was plainly a savoy. N. NEWMAN'S (London) interest in still life is quite different. It is in colour and form rather than surface texture. His painting, No. 82, has made full use of rich colour. Next to this painting is another still life by A. PHILLIPS (London); this has a most interesting composition and is sensitively handled.

In this exhibition of amateurs' paintings there are very few that are completely unsophisticated and unhampered by knowledge of academic painting. Exceptions are the three paintings by S. LEONARD SIMPSON (London), Nos. 85, 100, and 184, which have a directness of vision and are charmingly painted, especially No. 100, *Play Time*, which is really delightful.

Water-colours and Drawings

The water-colour paintings and the drawings are on the whole a little unadventurous, relying too much on the traditional and academic handling of this very difficult medium. No. 155, *St. Mawes, February*, by T. HOLMES SELLORS (London), and No. 149, *November in Barking Park*, by G. H. ROSE, are two paintings that use the medium well and imaginatively to express the season at which they were painted. No. 131, *Colherne Road*, by ISABEL WILSON (London), and No. 142, *From the Kitchen Window*, by CONSTANCE APPLETON (Inverness), are two other paintings fresh in technique and interesting in detail.

Among the drawings there are six portrait heads drawn with considerable skill. These are much more successful than the painted portraits. No. 116, by RENÉ MICHELMORE (London), has a fine feeling for the character of the little girl portrayed. The sculptured head in bronze, No. 19, by DAVID I. FINER (Kent), is also an accomplished piece of work having great solidity.

Final Impressions

The exhibition leaves one with the impression that, although the intelligence and skill of the medical profession can readily master the craft of painting, most doctors are reluctant to treat painting as more than a relaxation. If the painters had tried to communicate something of their special experience as doctors the exhibition could have had deeper significance.

And again, most doctors must be acquainted with art-therapy as used in tuberculosis and mental hospitals to reveal the buried thoughts and problems of their patients. It seems a little strange, therefore, that some of the exhibitors were not tempted to use the methods of art-therapy in their own painting.

A new half-yearly journal, *Veterinary Reviews and Annotations*, issued by the Commonwealth Bureau of Animal Health, Weybridge, has commenced publication. It consists of reviews of topical veterinary subjects and is obtainable from the Commonwealth Agricultural Bureaux, Farnham House, Farnham Royal, Bucks, price 25s. per annum. The first issue discusses intestinal diseases of young calves, parasites of poultry, and euthanasia for animals.

Correspondence

Management of Brain Abscess

SIR,—I felt sure that Mr. Walpole Lewin's article on this topic (*Journal*, March 12, p. 631) would provoke an otological protest about the route via which such abscesses should be approached, and my friend Maxwell Ellis (*Journal*, April 2, p. 848) has not disappointed me. It is perfectly true that in well-established cases where the brain abscess already is well localized simple drainage via the mastoid has often proved to be entirely satisfactory. But this presupposes a mastoidectomy, which may in fact not be needed in the early stage, if at all.

Otogenic brain abscess can arise in relation with acute or chronic otitis. In both cases the condition which may kill the patient is the intracranial complication, and this must take pride of place in regard to treatment. The underlying ear condition must have whatever treatment it merits, irrespective of the complication, but this should not be undertaken until the dangerous factor is controlled. In the acute case the chances are that adequate antibiotics will cure it without operation, or if operation be needed this can be done at leisure. In the chronic case otologists should not be stampeded into doing radical operations until the optimum moment, which will be determined by friendly consultation. We otologists should be invited to see these cases, and we should expect that our opinion on what should be done should carry weight, but in the last analysis our contribution should be secondary to that of the neurosurgeons.

If an otologist is faced with the possibility of doing something in a hurry for such patients miles away from neurosurgical help, he would do well to learn the simple technique of making a burrhole and needling the abscess. Close association with a neurosurgical unit for 18 years has made me realize that the best results are in fact obtained when the neurosurgeon operates through a clean field. Maxwell Ellis is fighting a gallant rearguard action, but I fancy he has reached the last ditch.—I am, etc.,

Oxford. RONALD MACBETH.

Salicylates and Anticoagulant Therapy

SIR,—I was interested to read Dr. M. H. Singer's letter (*Journal*, April 2, p. 851). I would refer him to my paper on "Aspirin in the Treatment of Vascular Diseases," the correspondence preceding it, and a leading article[1] on the subject, all in the *Lancet*. There is also a paper by Lovibond[2] in the proceedings of the British Cardiac Society.

For the past five years aspirin in suspension has been used at the Torbay Hospital as a routine treatment for coronary thrombosis, pulmonary embolism, and thrombophlebitis. It is widely used in this area by many doctors who prefer it to the better-known anticoagulants for domiciliary use, for it is not only a safe anticoagulant but it often relieves anginal pain as effectively as nitroglycerol. I have not yet had time to assess the results during this five-year period, but I hope to do so shortly. The fact that so simple and ancient a remedy has maintained its popularity in this area for five years speaks well for its value.—I am, etc.,

Torquay. PAUL C. GIBSON.

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[2] Ibid., 1949, 1, 189.
[3] Lovibond, J. L., *Brit. Heart J.*, 1950, 12, 429.

Doctors and the Press

SIR,—I had not intended to enter this correspondence, but the letter of Dr. Alfred Byrne, Medical Correspondent of the *Manchester Guardian* (*Journal*, March 26, p. 791), requires a certain amount of annotation, for it attempts to suggest that Press attention was of benefit to the mother of the Nigerian twins.

Before the operation on the children, and for a couple of weeks after it, their mother showed the greatest possible emotional disturbance at the very mention of the word reporter and insisted on not meeting any. Furthermore, at one point in this period she had to be persuaded not to withdraw her permission for operation and not to return to Africa with the children unseparated; discussion in the Press of the prognosis had led her to believe that the operation could not succeed. She was particularly upset not only at attempts to obtain unofficial photographs of the babies through the ward windows, but was even alarmed for the survivor's safety when the official flashlight photographs were taken. She particularly refused to receive those persistent representatives of certain Sunday newspapers who insisted on bargaining with each other in attempts to buy an "exclusive interview" for large sums of money. Mrs. Davies's permission for interview was *not* "forthcoming." After a couple of weeks had passed, when she was convalescent from her anxiety and grief, she was persuaded by me to attend an official interview with a representative number of reporters, and I have no doubt it was this occasion to which Dr. Byrne refers as "a lengthy interview." This interview was trying. Nevertheless, the mother of the twins, who is a gentle, kind, and courteous person with a short memory for evil things, told the collected reporters, when directly interrogated, that she had found them all nice except two. This excepted number would have been much larger if she had not enjoyed special protection. On balance, Press attention was harmful to the mother of these children, and if access to her had been freer it might have been harmful in an extreme and long-standing degree.

The distribution of news to the Press had to be meagre rather than "adroit," because even before the children arrived in England their identity had been disclosed to the public. Intimate anatomical and pathological details cannot be supplied about an individual whose identity is known unless that individual or his or her guardian gives permission, which in this case was not obtainable. Dr. Byrne refers to the "large business house which had a finger in the pie." The use of this last term nearly always implies rancour, which in this connexion is not dissipated by Dr. Byrne's failure to mention that the company in question, the United Africa Company, had not only been officially responsible, without any wish for publicity or profit, for bringing the mother, the twins, and a nurse to England, but was regarded by the lady in question as her protector, and its Press representative her nearest friend, adviser, and confidant in this country. The Press representative of that company, Mr. Dennis Buckle, handled the whole situation extremely "adroitly" in my opinion, and the actions of the company were uniformly responsible, honourable, and humane.

Dr. Byrne mentions an article in a weekly magazine and appears to be resentful also about its appearance. I would refer him to the article again and he will find that no part, internal or external, of either baby appears in any part of the illustrations except for one picture which had already appeared in the public press; in the illustrations shown none of the doctors concerned could be identified by his closest friend; no fact appeared in the article which had not previously appeared, or at least been deducible from facts previously published, officially or unofficially, in the public press. Some of these facts had appeared exclusively in the *Manchester Guardian*.

The help of the Public Relations Officer of the British Medical Association, Mr. John Pringle, was refused in the case of the recent twins because the relatives of the twins had made secrecy an absolute condition. To my mind, if a doctor has given his word specifically not to disclose some particular secret he is not at liberty to disclose it in any circumstances. I think any man of honour would agree with this principle even in a non-medical connexion. Dr. Byrne quotes Mr. Pringle in writing that, if the help of the British Medical Association had been accepted, the two cases of the twins would "have had the courteous co-operation of all but the less reputable elements of the Press." The answer to this argument is implicit in the last six words. It is precisely the less reputable elements of the Press whose attention most people hope to escape. The only way to escape it is to achieve secrecy. Although we have since been told by a person of responsibility in newspaper work that secrecy in such cases is unobtainable because of the wide network of paid Press informers throughout all the hospitals of the land, secrecy was in fact obtained in the case of the recent twins, at least for the period covering their investigation and operation.—I am, etc.,

London, W.12. IAN AIRD.

Winter Coughs

SIR,—Apropos of your leading article on winter coughs (*Journal*, March 12, p. 651) in which you rather tend to depreciate paregoric, may I remind you of your own annotation (*Journal*, September 30, 1944, p. 441) wherein you summarize the experimental results of some Canadian workers, which I in turn may sum up in brief by quoting Quincy's[1] opinion—that is, that opium procures a truce with the cough and so provides opportunity for the other ingredients to rarefy and thin the viscid cohesions in the vessels, etc.? Certainly Boyd and MacLachlan[2] show most clearly that paregoric, especially when matured by keeping, increases the respiratory tract secretion of experimental animals, in the case of albino rats by as much as 300%.—I am, etc.,

South Molton, Devon. R. A. NASH.

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2 Boyd, E. M., and MacLachlan, M. L., *Canad. med. Ass. J.*, 1944, **50**, 338.

Night Cramps

SIR,—Night cramps have, during the last few years, rather interested me, as I have seen about a dozen cases of this unfortunate complaint in general practice, and in each instance the patient has merely mentioned it *en passant*, as "one of those things." Quinine tablets have given relief in a number of cases, but in none have I found anything to compare with mephenesin elixir given last thing at night *in water*, since taken neat it does cause a burning sensation.

I have actually been able to experiment on my own family, since my wife had paralytic poliomyelitis four years ago and, although she has only very slight residual weakness in one leg, when she is tired this one leg is very liable to cramp at night especially when lying in certain positions. Mephenesin was given by me over a period of three months and the terrifying cramps were definitely improved. I also found that, if one can elicit which muscles are cramped, putting the limb in the opposite position by forcing it against the affected muscle—that is, flexing forcibly the leg at the knee when the quadriceps are in spasm—will break the attack. I have endeavoured to teach my patients a little basic anatomy so that they may gain relief from this manœuvre should mephenesin not be 100% efficient.—I am, etc.,

London, W.6. DAVID JACKSON.

The Metric System

SIR,—We are all intellectually convinced that advantages would accrue if we could convert our system of weights and measures and our mental concepts to a metric system. Not everyone is convinced that the benefits would be worth the not inconsiderable effort of making the change. Clinicians all require to be familiar with both systems, but most people have two distinct mental compartments for things like bodyweight, which are kept in the British unit compartment, and those like doses of sulphonamides, which live in the metric compartment. The two mental compartments are usually highly exclusive: any transference requires a complicated administrative process reminiscent of a civil service office. Who, for example, could quote the usual dose of sulphaguanidine in grains or his own height in metres without recourse to paper and pencil if not to a reference table?

One of the many ways in which this schizophrenic thinking inhibits good work is in prescribing fluid or electrolyte replacement. The tradition of ordering "a pint of 5% glucose-saline" or "a pint of blood and a pint of half-

strength saline" dies hard. It is based on rule-of-thumb therapy which clinicians have learned by experience to be appropriate in certain conditions, but it is rarely the result of logical thinking. The importance of reasonable precision in adjustment of body fluids is becoming increasingly apparent. Most who have some years of experience behind them can think back to patients whose death was probably due to imbalance of their internal body fluids. There is no doubt that the only satisfactory way to record concentrations of these ionic solutes of the body and the amounts lost in excreta and effluents is in milli-equivalents per litre. To calculate how much should be put back when transfusion solutions are marked in per cent by weight and in ounces and pints is most laborious; it is usually not attempted or is thrown back to the "lab. man." Let anyone who is in doubt calculate how many ounces of 5% sodium lactate and of half-strength saline are required to make good a deficit of 47 mEq. sodium and 32 mEq. chloride, and if he is still in doubt let him make the necessary adjustment if it is also necessary to give 15 mEq. potassium as KCl. If people could be persuaded to accept transfusion fluids marked in mEq./litre of each ion and the volumes in litres and half-litres the necessary calculation could be done mentally in ten seconds. The arithmetic required under the present system is such that the majority refuse to attempt it and continue to give fluid by "blind experience." There are those who would maintain that blind experience is an oxymoron and that they can get on well without milli-equivalents and analyses of body fluids; similar statements have been made about antiseptics, *x*-rays, and anaesthetic machines. There are many cases where plasma and urine analyses are unnecessary, but there are also many cases where they would have led to life-saving measures.

The obvious conclusion is to have transfusion fluids marked in both systems for the present. The intelligent use of such fluids would be greatly promoted, the not inconsiderable danger of mistakes in calculation would be eliminated, and lives would be saved.—I am, etc.,

Glasgow, C.4. JAS. C. EATON.

Chicken-pox Quarantine

SIR,—Most of us will agree with Dr. M. Curwen (*Journal*, March 19, p. 727) and Dr. J. F. Warin (*Journal*, April 9, p. 908) that too much fuss is made about chicken-pox in schools. Certainly the adult with, for example, painful herpes ophthalmicus, complicated perhaps with iritis, may find it difficult to be grateful to the school doctor for the zeal with which he prevented him from acquiring immunity at the expense of a trivial illness involving a few days in bed. On the other hand, severe cases of chicken-pox do exceptionally occur, and if one were to connive at the infection of a child who subsequently developed chicken-pox complicated by encephalitis one would scarcely feel very happy about it nor would one's medico-legal position be very secure.

I agree that the segregation period for chicken-pox is also very much over-done. For many years in hospital I have worked on the assumption that as soon as the last lesion has well scabbed the risk of transmission is negligible, and it has so far never let me down. This period usually coincides with Dr. Warin's "five or six days after the appearance of the rash," though occasionally if there are several crops it may take a little longer.—I am, etc.,

Isleworth, Middlesex. G. E. BREEN.

SIR,—Recent correspondence in the *Journal* on the subject of chicken-pox prompts me to report the following case.

On January 31, 1955, I was asked to see a girl of 8 years, whom I found to be suffering from chicken-pox. Her mother was on that actual date due for delivery of another child, and as she was quite positive that she had had the disease in infancy the arrangements made for home confinement were allowed to stand. The baby, a girl, was born spontaneously on February 2, but ten days later the remaining child, a boy aged 2 years, developed typical chicken-pox. On February 17 the baby, now aged 15 days, developed a similar rash, which responded well to treatment with an ichthyol-calamine lotion, and had cleared away completely by early March.

From those textbooks which I have been able to consult I find that chicken-pox is a distinct rarity in the neonatal period. I would be interested to learn if any readers have seen other cases as young as mine.—I am, etc.,

Glasgow, N.2. NEIL MCDOUGALL.

Ban on Heroin

SIR,—The relief of severe pain, especially in those dying of incurable malignant disease, is surely the moral duty of every doctor. If therefore heroin is required, as it certainly is, for those patients who have become resistant to the less potent analgesics, then no effort should be spared to ensure its legitimate supply, regardless of the administrative inconvenience it may cause a government.—I am, etc.,

Ipswich. JAMES WIGDAHL.

SIR,—We were astonished to learn from Dr. A. H. Douthwaite's letter (*Journal*, April 9, p. 907) that the Government has decided to ban heroin. We would like to add our protest. Quite apart from the usefulness of the drug, it seems to us an intolerable interference with our liberties, which should not be borne by the medical profession without objection.—We are, etc.,

F. C. HEATLEY.
H. J. BLISS.
Winchester. G. H. FISHER.

Hypodermic Injection Technique

SIR,—Being to-day mainly concerned with the immunization of young children against diphtheria and whooping-cough, I would like to comment on Dr. K. D. Salzmann's letter (*Journal*, April 9, p. 909). I have for a long time applied his principle without, I admit, defining, as he has so ably done, the factors responsible for its undoubted success. All my injections are given in the deltoid region, and the very great majority are subcutaneous. When inoculating babies and very young children, and especially when the victim insists on watching what is going on, I find that stroking the skin gently two or three times with the back of the needle before inserting the point often allays suspicion. Yet more important, having punctured the skin—the critical point in the operation—I hold the syringe absolutely still for a second or two before pressing the piston, using meanwhile every available device for distracting the child's attention. Incidentally, a slight protrusion and side-to-side movement of the tip of one's tongue will often so astonish the patient that a ml. more or less no longer matters. A No. 20 needle is an ideal weapon of attack; and it must be remembered that adsorbed antigens with a mineral carrier cause, *per se*, more pain on injection than do the newer suspended vaccines.—I am, etc.,

Cross-in-Hand, Sussex. H. L. DUKE.

Hot-water Bottle Burns

SIR,—Yet another case of burning by hot-water bottles has been recorded in your columns (*Journal*, April 2, p. 856). It seems reasonable to call for a critical review of the use of hot-water bottles, at least in the care of the severely injured.

Recent work has shown that it is more important to prevent further loss of heat from a shocked patient than to add heat. When the circulation of the skin is depressed the heat added to it from without tends to accumulate and cause a rise in temperature which may reach locally lethal levels. Some years ago Sheehan[1] reported the case of a woman who died following obstetric shock. A hot-water bottle had been applied to her side, and although its temperature was not very high the underlying tissues, including the surface of the liver, were found at necropsy

to have been partly cooked. Even in a fully conscious patient the pain of a burn quickly passes away after the full thickness of the skin has been destroyed. If the burning agent remains after the pain has disappeared a very serious burn can result.

These facts leave no doubt that deliberate warming of patients should be completely abandoned and that reliance should be placed upon reducing loss of heat by careful wrapping in blankets; even in the freezing conditions of the Italian campaign during the war this was found adequate. The old campaigner's advice about having as many blankets under the patient as over is particularly important in this connexion.—I am, etc.,

Birmingham, 15. P. S. LONDON.

REFERENCE

1 Sheehan, H. L., *Lancet*, 1948, **1**, 1.

Castration of Sex Offenders

SIR,—It is an axiom of moral philosophy that the moral law must be supreme. Expressed more explicitly, this means that if an action is condemned by the moral law then no reasoning, medical, sociological, or scientific, can justify that action.

A few years ago the Church of England Moral Welfare Council issued a booklet on sterilization,[1] in which it stated there appear to be no circumstances in which it would be legitimate for the State to exercise the right of punitive sterilization. The reasoning behind this statement is fully set out in the booklet. It further pointed out that as regards therapeutic sterilization properly so-called (to be distinguished from operations necessary to the welfare of the body as a whole which involve sterilization as an indirect effect—for example, hysterectomy), the rule is that an operation is only morally justified when it is the only means of securing the welfare of the body as a whole. In the cases quoted from the Danish experience, vasectomy or castration were not the only means of treating the delinquents.

As far as practising Anglicans are concerned, procedures such as the Danish castration one you commented on in your leading article (*Journal*, April 9, p. 897) can be of only academic interest.—I am, etc.,

Bath. J. H. WHITTLES.

REFERENCE

1 *Human Sterilization*. 1951, Church of England Moral Welfare Council. London

A Simple Method of Performing Bronchography

SIR,—Standard methods of bronchography are apt to cause great discomfort to the nervous patient, and the following method, dispensing almost entirely with local analgesia, has been carried out at the London Chest Hospital, Country Branch, in the past few months on a series of adults with excellent results. If the patients are producing copious sputum postural drainage is instituted under the guidance of a physiotherapist for several days prior to the investigation. As most of the patients have been tuberculous, with upper lobe bronchiectasis and little sputum, this has seldom been required. It has not been found necessary to provide antibiotic cover—for example, penicillin—and sensitivity tests have been discarded, as there is no release of iodine or iodides from the opaque medium used. Methylpentynol, two 250-mg. capsules, and atropine, 1/100 gr. (0.65 mg.), are given half an hour in advance, and have been satisfactory as a premedication.

The method of endotracheal intubation is used with the patient sitting up, and a Jacques No. 9 E.G. rubber catheter, smeared with 2% lignocaine ointment, is inserted into the right or left nostril according to patency. When it reaches the level of the posterior nares the patient is asked to put out his tongue, which is covered with a gauze swab. He is then instructed to pull his tongue forwards and downwards with either hand, and at the same time to protrude his chin forwards and slightly upwards. The catheter is slowly pushed onwards and the tip drops naturally into the larynx and trachea, causing a momentary tendency to cough, which soon passes. The basal and apical lower segments are filled by injecting 4–6 ml. of "dionosil oily" into the tube, after shaking the bottle, with the patient sitting up and leaning backwards and to the side to be filled, and with the shoulders rotated towards the same side. The middle or lingular segments are filled with a further 3–5 ml. while the patient bends forward and to the side to be filled, with the opposite shoulder raised and tilted forwards. The upper lobe is filled with the patient lying on his side with the head supported on two pillows to prevent the medium from running backwards up the trachea, using another 6 ml. Each of these three positions is maintained for one minute. *X*-ray films are then taken in full inspiration with the patient recumbent in the lateral or oblique and antero-posterior positions. It has been customary with tuberculous patients only to carry out bronchograms on one side at a time.

It will be noted that no local analgesic, apart from the 2% lignocaine ointment smeared on the catheter, is used throughout the investigation, the latter being used mainly for its lubricant value. This reduces the time factor so that it is possible to complete the bronchogram in an average time of 15 minutes, including developing the films. Toxic reactions to local analgesia are thus avoided, and the patient is able to eat his next meal without fear of food going "down the wrong way." Careful spraying of local analgesic into the back of the mouth and into the larynx has been found to be time-consuming and completely unnecessary. Indeed, it provokes coughing and laryngeal spasm so that it may not be possible to pass the tube beyond the patient's cords at all, and adds considerably to his discomfort. With this method laryngeal irritation is avoided and the tube slips easily into the trachea in a matter of seconds. Also it is of such a diameter that it is unlikely to be coughed up.

Patients subjected to this method of bronchography, and who have had bronchograms by other methods, have all been impressed by the small amount of discomfort caused and by the speed of the investigation. I would like to thank Mr. L. H. Porter, Chief Radiographer at the London Chest Hospital, Country Branch, Arlesey, Beds, for his co-operation with me in this work.—I am, etc.,

Frimley, Hants. JOHN C. BARKER.

Recovery from Chronic Lymphocytic Leukaemia

SIR,—May I add another case of 10-year recovery from lymphocytic leukaemia to those noted by Dr. Max Schott (*Journal*, April 9, p. 877)? In 1933 I was asked to see a well-known American aged 73 who was suffering from a mild attack of bronchitis. After a few days his general condition deteriorated and I noticed a few enlarged lymph nodes in various parts of his body. A blood count showed a typical lymphatic leukaemia. I told his wife—a former nurse—that he was suffering from something more serious than bronchitis. She replied: "Oh, has his leukaemia come back?" She then told me that her husband had been desperately ill for many weeks in 1923 with leukaemia, and indeed had been ill for some six months before making a complete recovery. He was very ill for some weeks, under my care, but finally insisted on making the attempt to return home. He died at sea. On her return home his widow sent me the report on his 1923 illness, by Dr. Gutmann,[1] of New Brunswick.—I am, etc.,

Buxton. F. A. BEARN.

REFERENCE

1 Gutmann, B., *Amer. J. med. Sci.*, 1924, **167**, 718.

Tropical Pulmonary Eosinophilia

SIR,—I have read Dr. James A. McFadzean's account (*Journal*, March 26, p. 771) with great interest, and wish to record my findings during 1943–4 at the Indian Military Hospital, Bangalore. During that period five cases of pulmonary eosinophilia were diagnosed and confirmed by the Army medical specialist. The signs and symptoms were as those described by Dr. McFadzean, and the *x*-ray findings in all cases were similar. The lungs showed a general woolly appearance, in fact one would mistake the *x*-ray for pulmonary tuberculosis. Treatment in those days was with N.A.B. and the response was very satisfactory, the whole condition clearing in about 12 weeks.

Two of the above cases were invalided from the Army, even though they showed great improvement, but psychological and malingering elements predominated, hence the reason for invaliding from the Army. The N.A.B. treatment was started at that time, as we had very good results

from N.A.B. in two cases of asthma. The course was bi-weekly injections starting with 0.15 g. and increasing to 0.45 g. The condition cleared, showing an *x*-ray of the lungs with clear fields, and W.B.C. within normal limits. In all cases the predominant signs were a very high W.B.C. count and the very typical *x*-ray findings.—I am, etc.,

Bagdad, Iraq. E. D. DE KELAITA.

Cancer Education

SIR,—The letters of Mr. Malcolm Donaldson and Dr. W. A. Ball (*Journal*, April 2, p. 849) criticizing our article (*Journal*, March 12, p. 627) call for brief replies. Mr. Donaldson is distressed by our "appalling" mistake in not mentioning and emphasizing "cancer." We admire his own pioneer work in the field of cancer education, and wish him all success. However, had we adopted his method our task would have been much more difficult than it was, and the problem of recalling patients for follow-up examination after doubtful or suspicious findings would in many cases have been insuperable. When the pioneers, such as Mr. Donaldson, have done their own important educational task on a really large scale, it may be possible to talk freely of cancer at medical overhauls. But that day has not yet come, at least in this district.

Dr. Ball's thesis, of a psychological-hormonal upset caused by our campaign and leading to an increase in cancer, is interesting, but not supported by figures. We have analysed the number of cancer cases in the practice (excluding the skin) over the last seven years, and there is no obvious effect of our campaign in the numbers recorded. In fact, there was a temporary increase that began six months *before* the outset of our investigation. It might well be that an intensive educational campaign would be accompanied by an increased incidence of recorded cancer, but this would more probably be accounted for by an ageing population, improvement in diagnosis and certification, etc. Such factors would at least have to be ruled out first.—We are, etc.,

J. WALTER.
E. C. ATKINSON.

Sheffield, 10.

Post-puerperal Recurrent Depression

SIR,—I have been interested in Dr. R. Greene's comments (*Journal*, April 9, p. 909) on my article (*Journal*, March 12, p. 637). It was not my intention to review the entire literature on the premenstrual tension syndrome. In the patients whom I described a state of chronic ill-health had existed since a childbirth some years earlier, with symptoms which were by no means confined to the premenstrual or ovulatory phases of the menstrual cycle. On the basis of the history I am much more inclined to look on these patients as suffering from a sequela of puerperal depression. The main practical point, however, is the profound alteration which has occurred at the puerperium in these women and which has persisted chronically. They and their families do not enjoy three weeks of normality every month as occurs in the premenstrual syndrome in its typical form. The history is so characteristic that I do feel most strongly that the post-puerperal group deserves separate consideration.

Dr. Greene and Dr. Dalton[1] have noted that, "in all cases in which the [premenstrual] syndrome had existed before pregnancy, the attacks occurred with increased severity at the first menstruation after childbirth . . . 15 dated the onset of regular attacks from childbirth. In severe cases, childbirth was followed by increasing weight and lethargy *in addition to* the premenstrual syndrome" (my italics). Clearly I should have referred to these observations, and I apologize to Dr. Greene and Dr. Dalton for not doing so.

In addition I should like to cite an interesting paper by Dr. Joan Malleson[2] in which an attempt is made to find a common factor linking premenstrual disturbance, menopausal upset, puerperal depression, and involutional melancholia. Under the heading of puerperal depression, she writes: "It is commonly found that, if menstruation returns before the psychosis is resolved, exacerbations occur repeatedly in the premenstrual phase." This is much nearer to what I intended to convey, but again I must stress that symptoms are not confined to the premenstrual phase.—I am, etc.,

Birmingham. A. B. HEGARTY.

REFERENCES

1 Greene, R., and Dalton, K., *British Medical Journal*, 1953, **1**, 1007.
2 Malleson, J., *Lancet*, 1953, **2**, 158.

The "Nape" Naevus

SIR,—In this corner of Berkshire we have never heard of the Sturge-Weber-Kalischer syndrome, but we frequently see a nape naevus on newly born infants. Any midwife will tell Drs. J. Shafar and A. Doig (*Journal*, April 9, p. 913)—and I pass this information on to them—that it is caused by an affectionate peck from the stork who delivers the child before taking final leave of its charge.—I am, etc.,

Streatley, Berks. J. R. B. DIXEY.

SIR,—Drs. J. Shafar and A. Doig (*Journal*, April 9, p. 913) have found that a superficial vascular naevus in the nuchal region is much commoner than most doctors had supposed, and that its presence is not generally associated with other congenital abnormalities. Its situation over the upper (cephalic) level of the spinal cord may perhaps be compared to the presence of so-called "mongolian" pigmentary naevi in the sacro-gluteal region at the lower (caudal) end of the spinal cord. Another type of superficial naevus near the lower end of the spinal cord is the multiple angiokeratoma (haemangiokeratoma) of the scrotum. This latter must, I think, be regarded as a mild local form of the rare condition of "angiokeratoma corporis diffusum," which, according to J. H. Price,[1] may possibly constitute part of a very rare inborn metabolic lipoid storage disease.—I am, etc.,

London, N.W.1. F. PARKES WEBER.

REFERENCE

1 Price, J. H., *Brit. J. Derm.*, 1955, **67**, 105.

Low Back Pain Treated by Manipulation

SIR,—The recent article on "Low Back Pain Treated by Manipulation" (Dr. A. B. Coyer and Dr. I. H. M. Curwen) (*Journal*, March 19, p. 705) comes opportunely at a time when there is considerable discussion on this form of treatment in the correspondence columns of the *Journal*.

Controlled clinical experiments are unfortunately rare in physical medicine. When studying a controversial form of treatment for a symptom complex rather than a definitive diagnosis the standard of "control" needs to be of the highest order, and it is unfortunate that we are not convinced of the validity of the design of this particular experiment. Tegner[1] has said: "We should be aware that the classical attack of lumbago usually clears up of itself in the majority of cases after a comparatively short period, and we should not blindly accept the disappearance of symptoms to be the result of whatever treatment has been ordered. Long before we knew about prolapse of the intervertebral disk we treated lumbago and sciatica with considerable success. And what is more, many sufferers from these conditions were treated successfully and safely with rest and analgesics alone, and the patients got better. Such facts cry aloud for proper controlled experiment in our evaluation of the results of the treatment we prescribe."

The snares of "historical controls" have been forcibly emphasized,[2] and the "controls" for this series can hardly be called more than "historical." The key to clinical investigations must lie in the criteria for diagnosis, and the more detailed the criteria the more comparable will be the groups of patients. In this series no diagnoses are recorded, and detailed criteria for selection are not specified. For example, it is stated that 50% of the patients manipulated were free of signs and symptoms at the end of one week compared with 27% of the controls. This is an impressive result, but it would have been more logical to compare the patients with limitation of straight-leg raising. If this is done we find that 20 of 39 (51%) patients with limitation of straight-leg raising were free of signs and symptoms at the end of one

week compared with 10 of 26 (38%) of similar controls (much less impressive, but more logical). The Chi-square test applied to these figures gives $\chi^2_1 \simeq 1.1$, and $P<0.2$. The difference between the groups is not statistically significant. Limitation of straight-leg raising may be used to separate between two clinically distinguishable types of patient with low backache or sciatica.[3] Thus in this series under discussion three clinically distinct groups of patients are being lumped together (those with a severely limited S.L.R., those with slightly limited S.L.R., and those with no limitation of S.L.R.). Is the thesis held that these clinically separate and probably pathologically different groups are all amenable equally to one form of treatment ?

Many cases of derangements of intervertebral joints, and lesions of the supporting ligaments of the spine, may give rise to referred sciatica.[4–6] These cases have been excluded, for no patients with radiation below the buttock were selected. There has been no selection, for example, according to mode of onset, surely most important in relation to reaction to treatment. Although site of pain, presence of congenital defects, and recurrences and other factors have been recorded these have not been separately analysed, so the unwary reader is led to the conclusion that, having excluded "rarer and more serious causes," manipulation is the treatment of choice whatever the diagnosis. As many cases of derangement and prolapse are excluded, as indicated above, then what was the pathological lesion in most of the patients in this series ? It is felt that many may have been postural defects, muscular lesions and similar disabilities in which rest and sedation were in fact *contraindicated*.

Without a detailed analysis allowing for the study of strictly comparable groups of patients, this series does not help in the elucidation of the part that manipulation has to play in the relief of backache.—We are, etc.,

P. J. R. NICHOLS.
D. J. E. CHESHIRE.

Yealmpton, Devon.

REFERENCES

1 Tegner, W. S., *Proc. roy. Soc. Med.*, 1954, **47**, 389.
2 Reid, D. D., *Lancet*, 1954, **2**, 1293.
3 Charnley, J., ibid., 1951, **1**, 186.
4 Kellgren, J. H., *Clin. Sci.*, 1939, **4**, 35.
5 —— *Lancet*, 1941, **1**, 561.
6 Newman, P. H., *J. Bone Jt Surg.*, 1952, **34B**, 30.

Boxing Injuries

SIR,—I hasten to reassure Dr. H. Simon (*Journal*, April 2, p. 853) about albuminuria in boxers. I have frequently examined the urine of boxers after training and sparring in the gymnasium *without any exchange of blows*, and have found albumin and sometimes blood present. The urine becomes clear in three to four hours. Albuminuria and haematuria are quite frequent after violent physical exercise and leave no after effects. All boxers under the control of the London Amateur Boxing Association have their urine tested in their routine examination on joining a club.—I am, etc.,

J. L. BLONSTEIN.

London, W.1.

Oxygenation by Needle Puncture in Asphyxia

SIR,—In connexion with Mr. N. A. Jory's article on "Acute Respiratory Obstruction" (*Journal*, March 26, p. 781) I would like to suggest the following method of giving oxygen as possibly being a useful measure in the treatment of some of the cases discussed.

The method consists in the administration of oxygen via a fine cannula, such as is used in "lipiodol" bronchography, which is passed through the crico-thyroid membrane. The cannula is attached by a suitable mount to the delivery tube from an oxygen cylinder. Dr. G. M. Willey and I have demonstrated that this method is quite adequate to restore quickly full oxygenation in anoxaemia during general anaesthesia.

In passing the trocar and cannula through the crico-thyroid membrane the use of a tenotome for skin-puncture makes the procedure easier, as the skin in this region may be very tough. When the cannula has been inserted, the preliminary passage of a fine polythene tube well down into the trachea will indicate that the end of the cannula is free within the lumen of the trachea, thereby obviating the risk of surgical emphysema. Indeed, oxygen may be administered through the fine polythene tube introduced in this manner, but not of course so freely as through the lipiodol cannula itself. I have found Forestier's trocar and cannula suitable for the purpose.

Apart from laryngeal obstruction, the method might very well be found useful in cases of drowning and coal-gas poisoning, and the polythene tubing method of administering oxygen in cases of clinical anoxaemia. A convenient pack containing a baby oxygen cylinder, trocar and cannula and fine polythene tubing, etc., could easily be assembled for first-aid work.—I am, etc.,

W. H. B. MAGAURAN.

London, W.1.

Fluoridation of Water Supplies

SIR,—I have been interested in this subject for some years, and it is extremely difficult to be certain that it is quite safe for every individual to have 1 p.p.m. of fluoride added to the water supply in an endeavour to reduce the incidence of dental decay.

It is surprising that, in the midst of the discussions in connexion with the improvement of the dental condition of schoolchildren, little is said of the great need for improved oral hygiene. The oral condition of many of our schoolchildren is really alarming, and an intensive campaign to encourage the use of the tooth-brush would be a valuable and safe contribution towards a very considerable reduction in dental caries and improved oral health. Local authorities might well direct their energies in this direction as a first step.—I am, etc.,

DAVID A. FINLAYSON.

Dundee.

SIR,—The Delaney Committee, which investigated this matter in 1952, correctly stated in its report[1] to the U.S. Congress : "It is safe to say that fluoridation is mass medication without parallel in the history of medicine." Even if its effects were less controversial than they appear to be, it is clear that this method of wholesale, indiscriminate administration of what is undoubtedly a highly toxic substance is improper, and constitutes a complete break with the medical tradition of individual care and responsibility.—I am, etc.,

A. RUGG-GUNN.

London, W.1.

REFERENCE

1 *Fluoridation of Public Drinking Water*, Report of the House Select Committee to Investigate the Use of Chemicals in Foods and Cosmetics, No. 2500, Eighty-second Congress, Second Session, 1952.

Speaking Up

SIR,—In reply to Dr. J. Hamilton McIlroy's letter (*Journal*, April 2, p. 853) on the subject of the inaudibility of medical lecturers, I would like to suggest the following "prescription" which I found written in large letters in a pulpit in a Methodist church in Halifax : "Speak up, the deaf aid is not working."—I am, etc.,

D. G. BATES.

London, S.E.1.

Hazards of Electric Razors

SIR,—Dr. A. S. Porter's letter (*Journal*, April 2, p. 854) mentions a condition to which referral is surely overdue in your columns. That modern, and otherwise invaluable, instrument, the electric razor, is an undoubted potential cause of sneezing attacks in the morning and of painful snippets of hair in the eye.

Most of the trouble is due to its use whilst lying supine in bed, a device adopted by poor risers not only to keep the legs warm but to save having to clean out the appliance after use. So far as the eyes are concerned, they can be covered with spectacles ; the nostrils can likewise be packed loosely with cotton-wool ; but, in any case, the tendency is for a recumbent shave to drag on in time, with the weight of the appliance resting heavily upon the cheek of the same side as the dominant hand. This leads to a further hazard of the electric razor, which is traumatic neuritis of one or more of the cutaneous sensory filaments where they

cross bone to reach the temporal fossa. The vulnerable sites appear to be either far forward over the malar bone, where injury leads to pain in screwing up the eye; or again just above the mandibular point, where the condition might have to be distinguished from temporal arteritis.—I am, etc.,

Richmond. JOHN DANCY.

Natural Childbirth

SIR,—I was sorry to read of Mrs. Constance Lynn's painful and disappointing experience (*Journal*, April 2, p. 851), but, for fear that it should prove discouraging to others, I should like to put it in perspective, comparing it with my own experience in dealing with some 4,000 deliveries at Stonefield Maternity Home (Blackheath) over the period 1920–54. From the first my late partner and I worked for "natural childbirth," and in the last 20 years developed our methods considerably and along very similar lines to those used by Dr. Dick Read. We had a unique opportunity of observing, for the antenatal work, the delivery, and the puerperium were conducted under our own roof, and we remained in touch with most of the mothers for a year and often longer.

Results were most encouraging. A large proportion of our later patients suffered no more pain than they were able to bear without distress; labours tended to be short and without fatigue with its risk of haemorrhage and shock. Our forceps rate dropped from about 12% to 3%. We used pethidine freely, and occasionally gas and air as well. But perhaps the most striking result was the great happiness of many women during the birth. We never promised a painless birth, and I always impressed on my patients that the physical effort of the second stage was probably greater than any they had ever been asked to make. We found the presence of husbands in this stage to be a great encouragement. (One of them, after a long journey, fainted, but his wife immediately rose to the occasion and encouraged him so that five minutes later he was able to witness the birth.) While sympathizing with the disappointment of Mrs. Lynn and "quite a few recent mothers" of her acquaintance, I submit that her claim to "give a true and tried viewpoint" is not justified.

Dr. Dick Read and I, and many others whose enthusiasm has been kindled by results, realize that we are up against a fearful attitude of mind in the expectant mother, which has existed for centuries, and which tends to be both hereditary and infectious, so we cannot expect 100% success in 30 years' work; but even so, the successes we do achieve provide our patients, their husbands, the doctor, and the nurse with the happiest moments of our lives.—I am, etc.,

Bristol, 9. CYRIL V. PINK.

SIR,—For evidence of better results from preparation for natural childbirth I would refer those interested to an article by Dr. Henderson in the *New Zealand Medical Journal*[1] in which 300 cases are compared. The 150 prepared cases show fewer complications and shorter duration of labour. Indeed, it is this very shortening of labour of which some doctors complain, saying that women have been so relaxed that the attendants were unaware that full dilatation had occurred.

Commenting on Mrs. Constance Lynn's letter (*Journal*, April 2, p. 851), I would suggest that too much enthusiasm is often followed by a sense of guilt over personal failure to achieve perfection, and that post-partum depression is a common state for which women should also be prepared. These personal reactions do not lessen the validity of Dr. G. D. Read's theories. High morale during pregnancy is certainly preferable to "a disease of nine months' duration," which was an earlier definition of pregnancy. Many women I know in New Zealand are greatly indebted to Dr. Read for a changed attitude, and some keen mothers have established a Wellington Parents' Centre in order to propagate the principles.

Dr. Dick Read has not deleted the word "labour" from the experience of childbirth, but has emphasized the sequence of fear–tension–pain which is an incontrovertible fact, and remains of lasting significance.—I am, etc.,

London, S.E.5. ENID F. COOK.

REFERENCE

[1] Henderson, A. J., *N.Z. med. J.*, 1954, **53**, 511.

Chlorpromazine

SIR,—Few will doubt the wisdom of the cautionary note sounded by the leading article (*Journal*, February 5, p. 338) which stressed the desirability of using chlorpromazine with caution.

The reason for this communication is to record the use of chlorpromazine in a few cases of intractable vomiting in whooping-cough. Few conditions can be more frustrating to treat, and frequently alarming to observe, in general practice. The results when chlorpromazine is used are dramatically gratifying, both to patient and parents. Its use for the condition, so far as I am aware, does not appear in the literature of the drug. My first case, in a child aged 3 years, required 10 mg. to control a situation that had led to ketosis and dehydration. The youngest case, aged 7 months, responded to 5 mg. My instructions to parents are to repeat the dose twice daily if required. Repeated doses to prevent recurrences have been only exceptionally required. In this clinical situation, and with the dose described, nothing but benefit to the patient has resulted, and with no insidious sequelae.—I am, etc.,

London, S.E.13. HOWARD REEVE.

Advertising by Post

SIR,—Like many of your readers I was at one time plagued by unsolicited and unwanted trade advertisements. I have largely overcome the problem, but it was a long battle. I started by sending to each firm in turn a brief but bold request asking for my name and all my addresses, past and present, to be removed from the mailing lists (except for any list devoted to my particular specialty—namely, radiological diagnosis). My postage expenses were high, particularly as it was soon apparent that in many cases my requests were not being heeded. Perhaps the manufacturers have a similar problem, that of receiving unsolicited and unwanted correspondence, and maybe my letters were going straight into the waste-paper basket. Be that as it may, I did obtain a response in these cases by returning the literature in its original envelope with the flap stuck, addressed back to the sender, and without any stamp. I saw no reason why I should be put to postage expenditure in respect of literature which I had never requested in the first place.

Mr. James H. Clayton (*Journal*, April 2, p. 854) states that "many manufacturers are constantly adopting more original techniques of getting their information over to the doctor in the hope that such will be amongst the favoured proportion singled out for detailed study." One of these methods is to use plain envelopes. These may be sealed at ordinary postal rates. They are more difficult to sort out from one's own mail. I have even had advertisements in envelopes marked "Personal" and containing only the trade circulars. This I regard as an impertinence, and I would have no hesitation at all in asking for a visit from the manufacturers' representative so that I may tell him in person that I do not wish to hear from his firm. At present more than nine-tenths of the mail which I receive is mail which interests me personally, and it does get read properly. There is therefore very little risk of important personal letters getting mixed up in a large pile of highly coloured glossy literature destined for the waste-paper basket.—I am, etc.,

Worcester. ANTHONY A. VICKERS.

SIR,—While I agree with Dr. Claud C. M. Watson (*Journal*, April 2, p. 854) that the representatives of the manufacturers are always most polite, I cannot agree that they are unnecessary. In the course of years I have learnt a good deal from these representatives and only wish that they came more often.

I receive about twenty advertisements a week. Having looked to see what the drugs advertised are for, I then look for the price. If it is not there the advertisement goes into the waste-paper basket without more ado. I always doubt the excuse proffered by the manufacturers—namely, that it is not possible to give the price, as it is liable to frequent fluctuations. Could not the profession take it that any price quoted was the price at the time of going to press?

I deplore the complete lack of dignity of many advertisements. Is it necessary to send to a "learned profession" circulars clad in all colours of the rainbow and armed with cupid's armamentarium?—I am, etc.,

Exeter. F. E. GRAHAM-BONNALIE.

SIR,—None of your correspondents has drawn attention to one great inconvenience caused by all these unsolicited free samples and circulars. Many doctors live at the beginning of a postal round and are therefore called out of bed at an early hour to receive these things. This, to me, seems an intolerable abuse, but doubtless the advertising firms would state that arrangements could be made with the post office for later delivery. This is undoubtedly true, but how many of us know this? I have only just found it out after 17 years in practice.—I am, etc.,

Reading. P. W. F. MCILVENNA.

Treatment of Vaginal Discharges

SIR,—May one of the "well-meaning travellers" to whom Dr. Elizabeth Gourlay refers (*Journal*, April 9, p. 912) be permitted to reply?

I think that it is true to say that very few, if any, firms claim to have found cures for vaginitis or any other condition. Initially treatments are suggested and trials carried out by practising specialists, where possible under controlled conditions. It is the duty of a traveller (or, as some of us style ourselves, medical representative) to pass on this information to as large a number of medical men as possible, and of their employers to market the products in an as efficient and economical form as possible.

During the course of some years' experience as a traveller, the products of my company have met with both praise and criticism, and it has always been my endeavour to present the doctors who grant me the privilege of an interview with a balanced view. When I meet with criticism I make a point of asking a number of other doctors whether they have had similar experiences, and by so doing sometimes get somewhere near the truth. A traveller's existence can only be justified by his products doing the job for which their manufacturers claim they are suitable.

The cynical observation, sometimes made to us, that we are all only concerned with £ s. d., is untenable, for the medical profession is the most discerning of all professions, and unless results are forthcoming all the travellers (no matter how well-meaning) and all the publicity in the world will avail us nothing.—I am, etc.,

Chichester. C. H. J. BISHOP.

Fibrositis

SIR,—Whatever fibrositis may mean, it is surely a matter of common observation that repeated local chilling may produce symptoms resembling those of grossly excessive use of a muscle or muscle group. Presumably the symptoms are in each case due to circulatory disturbance and with this a piling up of waste products.

I remember a patient whose constant pain in the side ceased when he was advised to discontinue sitting in a direct line from window to fire. A case quoted in the *Journal* many years ago described pain in the point of the shoulder of a lorry driver, relieved by providing a washleather lining to the shoulder of the coat. The windscreen was too narrow to keep the draught off the extremity of the shoulder. In his case many treatments and investigations had led nowhere. Faulty posture, possibly due to badly designed equipment, is a common cause of pain. I can remember backaches caused by the club chair, the feather bed, and the bucket seat of cars; also from a scullery sink too low for the housewife to use while erect.

A short haircut or a shampoo followed by inadequate drying of the hair sometimes gives me a headache. As cold without short hair, as when gardening without a hat, does the same thing, I wonder if a postural explanation is entirely adequate. It seems doubtful. But the neck pain of shorthand-typists occurs without cold and is surely postural, aggravated particularly by looking at work on the table and then at the typewriter at another level.—I am, etc.,

Hitchin, Herts. G. C. PETHER.

Bleaching of Hair by Chloroquine

SIR,—Chloroquine is now widely used in the treatment of chronic discoid lupus erythematosus, because it appears to be at least as effective as mepacrine without producing discoloration of the skin. Numerous toxic effects, mostly reversible, are described, but bleaching of the hair is one not widely known in this country; awareness of this seems desirable, as it might cause embarrassment. Alving *et al.*[1] studied the toxic effects of chloroquine given over long periods to inmates of a penitentiary; 300 mg. daily followed by 500 mg. weekly for a year bleached the hair of all blondes studied. Tye *et al.*[2] treated 48 patients suffering from lupus erythematosus with a loading dose followed by 250 mg. daily; in one redhead and one blonde the hair "was made lighter." The following case is of interest.

A married woman had suffered from very extensive chronic scaly lupus erythematosus of the whole face for 13 years; during six years I had given all the usual treatments, including mepacrine, without much benefit. On May 8, 1954, I started "nivaquine," one tablet daily (200 mg. of chloroquine sulphate); this brought about considerable improvement, but not complete clearing, so on June 26 the dose was increased to two tablets daily. On July 17 the eruption was clearer than it had ever been; a month later I went on holiday, and in my absence the dose was continued at this level until September 10, when I observed that the eyebrows were white and the scalp hair, normally a medium brown, was white for its proximal 20 mm. The patient told me that during a recent holiday the sunshine, instead of bronzing her as usual, had caused severe erythema not followed by pigmentation. Chloroquine was stopped on September 10; by September 25 the lupus was obviously active again. On October 23 her eyebrows had regained their usual colour. The scalp hairs showed normal pigmentation of their proximal 10–15 mm. separated by white bands of 25 mm. from the distal normal portions. This appearance was much more evident under Wood's light, the bleached areas showing a bluish-white fluorescence, as did a tablet of nivaquine suspended in water. At this time the patient asked for nivaquine to be resumed, as she considered the white hair more attractive than the lupus. Accordingly one tablet daily was given and continued until the present time (March 29).

The eruption is at present almost completely controlled. The bleached areas are still evident in the distal portions of the longer scalp hairs, and these still fluoresce, although the proximal portions do not do so.—I am, etc.,

London, S.E.5. D. E. SHARVILL.

REFERENCES

[1] Alving, A. S., *et al.*, *J. clin. Invest.*, 1948, **27**, Suppl. p. 60.
[2] Tye, M. J., *et al.*, *New Engl. J. Med.*, 1954, **251**, 52.

Society for Endocrinology

SIR,—Dr. P. M. F. Bishop's article on "The Development of British Endocrinology" (*Journal*, April 9, p. 865) was interesting and valuable as a record of events in this field. For the sake of accuracy I think I should point out that Dr. Bishop has overlooked a factual error. The two *present* secretaries of the Society for Endocrinology are, in fact, Professor C. H. Gray and myself. This statement does not, of course, in any way alter the intention of Dr. Bishop in referring to Professors Gray and Maclagan in the way that he does.—I am, etc.,

London, S.E.1. F. T. G. PRUNTY.

Obituary

A. D. SHARP, C.B., C.M.G., M.D., F.R.C.S.Ed.

The death occurred at Leeds on March 18 of Colonel A. D. Sharp, consulting ear, nose, and throat surgeon to the Leeds Public Dispensary and to Dewsbury Infirmary. He was 84 years of age.

Born at Keith, Banffshire, on November 6, 1870, Alexander Dunstan Sharp received his medical training in Edinburgh and took the Scottish triple qualification in 1900, being awarded four medals and three prizes during the course of his student career. After qualification he held the appointments of resident surgeon and house-surgeon to the ear, nose, and throat department at Edinburgh Royal Infirmary and resident physician at the Royal Maternity Hospital, Edinburgh. In 1901-2 he was on active service in the South African war as a surgeon with the 1st battalion of the King's Royal Rifles, being awarded the medal and four clasps. Sharp was elected F.R.C.S.Ed. in 1903, and in the following year he obtained the Brussels M.D. with distinction. After postgraduate study in London and in several European capitals he was appointed honorary aural surgeon to the Leeds Public Dispensary in 1906, an appointment which he was to hold for the next 43 years. He also became honorary aural surgeon to Dewsbury Infirmary, the Leeds Education Committee, and to Noble's Isle of Man Hospital, Douglas. Always keenly interested in the Volunteer movement, he was commissioned in the Leeds detachment of the R.A.M.C. in 1905, and on the outbreak of the first world war in 1914 held the rank of major. Later in the same year he was promoted lieutenant-colonel with command of the 1st West Riding Field Ambulance, taking the unit to France with the 49th West Riding Division in 1915. He was appointed A.D.M.S. of the division in 1916, by which time he had attained the rank of full colonel, and held the position until 1925. For his war services he was four times mentioned in dispatches, being appointed C.M.G. in 1916 and C.B. two years later. The honour of Commander of the Military Order of Aviz of Portugal was conferred on him in 1919, and in 1926 he received the Médaille de la Reconnaissance Française. He was awarded the Territorial Decoration in 1921, and from 1922 to 1927 was an Honorary Surgeon to King George V. A member of the British Medical Association for many years, he was chairman of the Leeds Division in 1928–9.

In 1909 he married Miss Amelia Sutcliffe, a medical graduate of Edinburgh University, and she survives him together with two sons and one daughter, to whom we extend our sympathy in their loss. One son is consulting aural surgeon to Charing Cross Hospital and to the Hospital for Sick Children, Great Ormond Street, and the other a barrister-at-law practising on the North-Eastern circuit.—G. A.

Mr. GEORGE SEED writes: For nearly half a century the name of Alexander Sharp has been prominent among medical circles in the West Riding of Yorkshire. He studied laryngology in Edinburgh and in the main European cities, and was the only ear, nose, and throat surgeon, until his retirement in 1949, at the Leeds Public Dispensary. This hospital, situated in the centre of Leeds, serves a densely populated area, and Colonel Sharp visited and operated at the hospital daily for many years, in addition to having a busy consulting practice. His out-patient clinics were huge and his operating sessions long. His commanding figure combined with his striking personality, and kindly disposition, were well known in the hospital. In spite of his training, Colonel Sharp was a strictly conservative surgeon, disliking any radical measures. He was one of the last physician-laryngologists, preferring nasal medication to drastic surgery. Many house-surgeons will remember his kindness. He was a keen supporter of the Leeds and West Riding Medico-Chirurgical Society and the section meetings of the Royal Society of Medicine.

Dr. W. D. CHAPMAN died at his home at Windermere, where he had lived for over half a century, on October 20, 1954, at the age of 83. William Daniel Chapman was born at Wanstead, Essex, on March 27, 1871, the son of Captain W. D. Chapman, of the Madras Staff Corps, and was educated at Trent College and at Corpus Christi College, Cambridge, receiving his clinical training at the London Hospital. He qualified M.R.C.S., L.R.C.P. in 1899, and took the M.B., B.Chir. degrees four years later. At Windermere, where he settled in practice, he soon entered into all aspects of the life of the district. He took an active interest in the work of the Windermere District Nursing Association and of the Windermere Lecture Association, being chairman of both bodies for many years, and of the Nurse Cavell Home, of which he was a trustee. From 1934 to 1949 he was a member of the urban district council, vice-chairman in 1947, and chairman of the health committee over a long period. It was the work of the council's library committee, perhaps, which gave him the greatest pleasure after his retirement from practice, and he continued to serve on it, as a co-opted member, for some time after he had resigned from the council. He was also a justice of the peace. A member of the British Medical Association for over 50 years, he was president of the old North Lancashire and South Westmorland Branch in 1922–3. Although he retired from practice some 20 years ago he continued to live at Windermere, and there to enjoy the lovely countryside and the companionship of old friends. For recreation he enjoyed a round of golf—he was a skilful player—and did not give up the game until some three years ago. In 1904 he married Miss Norah Moss, by whom he had two sons and one daughter, and in 1930 Miss Edith Barton, who survives him, together with the children of the first marriage.

Lieutenant-Colonel J. S. DUNNE died in hospital at Winchester on March 4 at the age of 77. After his retirement from the R.A.M.C., in which he had a distinguished career, he was for some years county director of the Hertfordshire Branch of the British Red Cross Society, and for a short time before the outbreak of the last war he was county A.R.P. controller. James Stuart Dunne was born at Edenderry, King's County, on November 2, 1877. He studied medicine in Dublin, taking the Irish conjoint diploma in 1905. In the same year he became a Fellow of the Royal College of Surgeons in Ireland, being awarded the gold medal for operative surgery and silver medals for theoretical surgery and midwifery. He then entered the R.A.M.C. and went to India as medical officer with the Royal Irish Regiment, being placed in charge of a cantonment hospital. Returning to the United Kingdom, he became medical officer at Woolwich, where he claimed to have the largest midwifery practice in the country. On the outbreak of the first world war in 1914 Dunne went to France with the Dragoon Guards, and later the same year was awarded the D.S.O. for heroism in the following circumstances: "During a German attack on the night of October 31, near Messines, he established a dressing station just behind the trenches, and was the means of saving many lives, he himself going several times into the trenches to

attend to wounded men who could not be moved." He was also mentioned in dispatches. Promoted to major in 1917, he was employed as embarkation staff officer at Le Havre towards the end of the war, and, after the Armistice in 1918, at Marseilles. From then until he retired under the age limit in 1932 he spent a good deal of time abroad. For three years he worked as a senior medical officer in Turkey, and later he was in charge of military hospitals at Cairo and Alexandria, being also senior medical officer for Northern Egypt. He attained the rank of lieutenant-colonel in 1930, and returned to England in the following year to become director of the surgical division at Woolwich. After his retirement from the R.A.M.C., Dunne settled, first at Welwyn Garden City, and later at Digswell, both in Hertfordshire, where his work for the British Red Cross Society was greatly appreciated. When the second world war broke out in 1939 he was recalled to the Army and was a member of a medical board from then until he left Hertfordshire towards the end of 1951 to live in permanent, but all too short, retirement at Whitchurch, in Hampshire. He married Catharine, daughter of Admiral Sir William Henderson, in 1920.

By the death of Dr. ROBERT MCLAREN on March 14, at the age of 83, less than a year after the death of his brother, Dr. JOHN MCLAREN, on July 16 last year, at the age of 89, Edinburgh has lost two examples of a fast-disappearing race of beloved general practitioners. The brothers lived lives based on the solid foundation of their religion; both at one time sang in church choirs; and in later life John McLaren was the senior elder of Christ's Kirk at the Tron for many years, while Robert McLaren became a well-beloved pillar of the Methodist Church at the Central Halls, Edinburgh. John McLaren graduated M.B., C.M. at Edinburgh University in 1889 and Robert McLaren took the Scottish triple qualification in 1900. Eventually both engaged in general practice in Edinburgh, each in his own practice, from which Robert McLaren retired in 1946. John McLaren became a district medical officer under the old parish council and was also medical officer for the Trinity Pensioners, while Robert McLaren was medical officer to the Edinburgh Skin Dispensary for 43 years, and during the first world war served in the R.A.M.C., both in this country and in Salonika. In their practices the brothers were more than just doctors. They were the friends and confidants of their patients, and their presence and personalities will be sadly missed. We may not meet their like again.—J. G. S.

Dr. HARRY SUGARÉ writes: I can fully bear out Dr. Walter Pagel's remarks (March 26, p. 793) about Professor MAX NEUBURGER'S privations after the first world war. On the back of a large visiting-card dated April 11, 1921, was written in English, "I am sorry that I don't possess a photograph of myself, and under the present conditions it costs too much, but I send you enclosed a very good copy and hope you will be satisfied with it." The excellent copy, with his characteristic signature, was taken from a scientific magazine.

Dr. ROBERT CHISHOLM died after a short illness on April 1 at the age of 80. Born in Assam, India, on March 10, 1875, Robert Chisholm studied medicine at Edinburgh and qualified by taking the Scottish triple qualification in 1902. He first practised in Pelton Fell, Co. Durham, where he gained a varied experience in a mining community. In 1915 he moved to Cambridge, where he was in practice until an accident forced him to give up medical work in 1920. Since then he had spent his retirement at Bedford, where he was a councillor, serving on the public assistance committee, and at Mill Hill, London. He had been a member of the B.M.A. for over 50 years.

A memorial service for the late Mr. R. DAVIES-COLLEY, who died on April 16, will be held in Guy's Hospital Chapel on Wednesday, April 27, at 1.45 p.m.

Medico-Legal

ACTION AGAINST HONG KONG DOCTORS FAILS

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

On February 11, 1955, in the Supreme Court of Hong Kong the trial was concluded before the Acting Chief Justice, Mr. Justice T. J. Gould, and a jury, of an action brought by Mr. Joseph Leslie Quie, a merchant, against three Government doctors for negligence in connexion with his certification as of unsound mind and his detention in a mental hospital. The defendants were Professor A. J. S. McFadzean, of Queen Mary Hospital, Dr. P. M. Yap, of the Mental Hospital, and Dr. S. H. Moore, of the Colonial Medical Department. Mr. Quie claimed $130,831.88 general and $119,168.12 special damages.

The plaintiff's case was that on March 12, 1952, Professor McFadzean was called in by his doctor, Dr. Yang, to examine him in consultation, and confirmed that he was suffering from cirrhosis of the liver. On the professor's advice he went into Queen Mary Hospital next day to try a new treatment, which he was told would last for two or three weeks, and there he was seen by Dr. Yap. On the evening of March 14 he was told that Professor McFadzean wished to examine him at the Matilda Hospital, and he went into the ambulance in his dressing-gown. He was taken to the Mental Hospital, seen by Dr. Yap, detained there in spite of his protests, and put in a padded cell. Some hours later he was moved to a private room. The diagnosis was manic elation, and Dr. Yap said in evidence that the patient seemed to have the appearance of an advanced chronic alcoholic or a person with general paralysis of the insane.

On March 19 Mr. Quie agreed to stay as a voluntary patient, but on March 22 gave seven days' notice that he wished to be released. Dr. Yap persuaded him to stay for a full three weeks, to which he agreed. On March 28 Dr. Yap applied under s.7 of the Mental Hospital Ordinance for an order that Mr. Quie should be conveyed to the Mental Hospital and detained for observation, and Dr. Moore signed the order, and on March 31 signed a certificate that he was of unsound mind.

On April 26, after a visit on April 10 from his lawyers, Mr. Quie was let out of the mental hospital and flew to England. There he was treated as a voluntary patient at St. Andrew's Hospital, Northampton, until May 20, and was discharged with a certificate that he was not certifiable as of unsound mind.

Mr. Quie's case that Professor McFadzean, Dr. Yap, and Dr. Moore had been negligent was supported by the expert evidence of Dr. Ellis Stungo, of London, who gave evidence that he had practised as a psychiatrist during 25 of the 29 years he had been qualified. He had seen Mr. Quie in England on July 23, 1952, and later, and said that not only was he not certifiable as insane, but that his certification and detention had been made on wholly inadequate grounds.

The case for the defendants was that not only had Professor McFadzean, Dr. Yap, and Dr. Moore exercised proper care and done their best in diagnosing Mr. Quie's condition, but also that their diagnosis had been correct and was supported by all the information which they had received in answer to the proper inquiries which they had made. Dr. Desmond Curran, senior consultant psychiatrist of St. George's Hospital, was called as expert witness for the defence, being flown from London for the purpose at the Hong Kong Government's expense. In his opinion, Professor McFadzean would have laid himself open to the severest criticism if he had not acted as he did. Dr. Curran used very strong expressions about some of the definitions given by Dr. Stungo in his evidence on behalf of the plaintiff, and declined to withdraw them when invited to do so by the plaintiff's counsel.

In his summing-up, Mr. Justice Gould said that the jury had to decide whether the defendants were negligent in expressing the belief that Mr. Quie was of unsound mind. Had they exercised reasonable care in making inquiries and in coming to their conclusions as a result of their examination of Mr. Quie and the information they had received? It was for the jury to consider whether these three medical men, not one of whom had any financial interest in the matter, had been negligent or acted in bad faith in this matter or not.

The jury, after an absence of one hour, returned unanimous verdicts in favour of the three doctors.

FINED FOR FORGERY

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

Reginald Morgan Ford, of Bedminster, Bristol, after obtaining a Swedish diploma in chiropody and physiotherapy, set up in practice as a physiotherapist in Bristol. He then entered Bristol University as a medical student, but a year later was expelled for breaches of discipline. He thereupon erased the central portion of a letter he had received from the General Medical Council, and inserted in its place a paragraph saying that he was a graduate in medicine and held the Bristol University degrees of M.B. and Ch.B.

Armed with this letter Ford got employment with several local doctors, and finally became locumtenent to Dr. W. B. Williams, of Knowle, during an illness. It was only when Dr. Williams decided to keep him on as assistant and wrote to the Bristol Executive Council that it was discovered that Ford's name was not on the *Medical Register*. Ford at first asserted that his name had been left out by mistake, but when taxed a second time by Dr. Williams admitted the truth.

Ford was indicted at Bristol Quarter Sessions for forging a letter from the chief clerk to the General Medical Council purporting to show that he was a qualified doctor. Sentencing[1] him to a fine of £100, the Recorder said that it was an exceptional case with startling mitigating features. Ford had possessed sufficient skill to satisfy those who had become his patients, and had been careful during his employment as assistant not in any way to abuse the professional position he had wrongly assumed. Apart from the bad example, he did not appear to have done any harm. He was given three months in which to pay the fine.

OPERATION ON WRONG KNEE

Damages of £40 and costs were awarded to a 5-year-old boy by Judge Allan Walmsley at Blackpool county court on March 30 for pain and suffering caused after a surgical registrar at Blackpool Victoria Hospital had operated by mistake on the wrong knee to remove a broken needle. The boy, Anthony John Sargeant, of Newcastle-under-Lyme, was awarded damages against the Blackpool and Fylde Hospital Management Committee.

The plaintiff's case was that he was admitted to the hospital with a piece of broken sewing-machine needle in his left knee. The surgeon, Mr. F. Galea, was apparently misled by the little boy and operated on the right knee. The mistake was realized, and after another operation the needle was removed from the other knee. There was no complaint of permanent disability to the right knee, but negligence was admitted by the hospital.

The boy's mother said the surgeon had told her he had made an incision into the boy's right knee because the boy insisted that that was where pain was. Later she took the boy to her own doctor, and on both wounds there was yellow pus. He could only walk stiff-legged. After visiting the doctor on about six occasions the boy was discharged. Following the first visit the doctor told her to keep the boy off his feet for fourteen days. She admitted that when the stitches were removed at the hospital there was no sign of sepsis on either of the wounds.

[1] *Bristol Evening News*, April 4, 1955.

Mr. William Lamont, consultant orthopaedic surgeon, said that having examined the boy he was not satisfied that the knee had been septic, because the sores on the knees were not thick and did not indicate previous infection. The scars would always be visible but not noticeable. Mr. Lamont added that the needle had penetrated just under the surface of the skin. A 1½-in. (3.8-cm.) incision was necessary to remove it, but it was not necessary to cut beyond ½ in. (1.2 cm.) deep.

Summing up, Judge Walmsley said the boy must have suffered additional pain by having a second operation and must have suffered handicap in moving about and playing. He also had the further handicap of a second scar. There appeared to have been a clerical error at the hospital which had an effect on the mistake. The judged stressed, however, that the mistake should not reflect on the surgeon's professional skill or competence, but he should have examined the radiograph with more "scrutinous care."

The Medical Defence Union instructed Messrs. Hempsons, solicitors, to act for Mr. Galea.

DANGEROUS DRIVING CONVICTION

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

Defending himself on summonses[2] for dangerous driving contrary to s. 11 of the Road Traffic Act, 1930, and for exceeding the 30 m.p.h. speed limit, Dr. P. J. Moriarty, of Bradford, suggested to the magistrates that as he was driving a midwife in his car to an urgent case his car had become an ambulance and that accordingly he was privileged under the Highway Code to exceed the speed limit like the police, firemen, and ambulance drivers. The evidence was that Dr. Moriarty had received an urgent evening call and was taking a district midwife with him to the case. His car was followed by two police officers along a road at 35 to 47 m.p.h. through two lots of traffic lights into another road, where it overtook two lines of traffic in some places and went through traffic lights at a road junction with its headlights flashing at 40 m.p.h., so that a woman who was crossing the road had to run to avoid being knocked down. After the clerk to the justices had pointed out that any privileges which police, firemen, or ambulance drivers might have under the Highway Code must be exercised consistently with safe driving, the chairman said that he disagreed with the suggestion that Dr. Moriarty's car had become for the time being an ambulance. The case of dangerous driving was found proved and a fine of £25 imposed, and a further fine of £5 was imposed for exceeding the speed limit.

Dr. Moriarty indicated that he would consider an appeal.

[2] *Yorkshire Observer*, March 26, 1955.

Universities and Colleges

UNIVERSITY OF OXFORD

The Gotch Memorial Prize for 1955 has been awarded to George Jamieson Ross McHardy, B.A., of Brasenose College.

UNIVERSITY OF CAMBRIDGE

In Congregation on January 22 the following medical degrees were conferred:

M.B., B.Chir.—J. T. N. Williams, J. H. C. Hunt, J. B. Pond, J. D. Ellis, *R. A. Carpenter, *P. A. Eckstein.

M.B.—J. N. Godlee, *P. J. D. Kirk, *I. McL. Flowers, *T. D. Carter, L. H. Blonstein, G. J. M. Milton-Thompson, C. B. Mortimer, G. C. Spackman, *A. H. Labrum, *J. N. Bodger, *C. F. Ridley, J. W. Blaxill, L. H. Hurrell, J. N. Rea, *D. H. Cameron, *R. Schram, Claudia M. B. Grigson.

*By proxy.

UNIVERSITY OF DUBLIN

SCHOOL OF PHYSIC, TRINITY COLLEGE

The following candidates have been awarded the Diploma in Gynaecology and Obstetrics:

S. K. Chattopadhyay, N. J. Choksey, Rosalie J. Gollan, Sister Mary Hyacinthe, M. A. J. Khan, E. S. Linton, S. Malhotra, P. O'Shea, H. B. Perera, Olga M. Rampersaud, A. Rosin, B. Saha, Ma Khin Aye Si, Eunice S. Simon, M. El K. A. Tarshouby.

UNIVERSITY OF LONDON

Mr. A. C. H. Bell has been appointed part-time Director of the Department of Obstetrics and Gynaecology at the Westminster Medical School from October 1, 1954.

The following have been recognized as teachers of the University in the subjects indicated in parentheses: *University College Hospital Medical School:* Dr. R. E. Bonham Carter (Children's Diseases); Dr. R. W. Cope (Anaesthetics); Mr. B. J. Harries (Surgery); Dr. R. F. Tredgold (Mental Diseases (Psychological Medicine)). *King's College Hospital Medical School:* Dr. B. S. Cardell (Pathology). *Westminster Medical School:* Mr. C. E. Drew and Mr. J. P. Reidy (Surgery); Dr. R. D. Tonkin (Medicine).

Dr. P. D. Samman has been granted probationary recognition as a teacher of dermatology at Westminster Medical School for two years from February, 1955.

UNIVERSITY OF MANCHESTER

The following candidates have satisfied the examiners at the examination indicated:

DIPLOMA IN PSYCHOLOGICAL MEDICINE.—*Part II:* H. L. English, P. A. L. Scott, B. F. Whitehead. *Part I:* L. Grimshaw, E. Howarth, D. F. Potter, K. E. Schmidt, Mrs. Irene Waga.

UNIVERSITY OF LIVERPOOL

The following candidates have been approved at the examinations indicated:

CH.M.—L. F. Tinckler.

DIPLOMA IN RADIOLOGY (RADIODIAGNOSIS).—*Part I:* R. S. Miller, F. P. Peach, V. Rogers, M. C. Winter.

DIPLOMA IN RADIOLOGY (RADIOTHERAPY).—*Part I:* B. Lall, S. H. M. Zaidi.

UNIVERSITY OF LEEDS

Dr. J. R. Fountain has been appointed Senior Registrar and Tutor in General Medicine and Mr. F. G. Smiddy Senior Registrar and Tutor in General Surgery at the United Leeds Hospitals for an initial period from a date to be decided until March 31, 1956.

UNIVERSITY OF SHEFFIELD

Dr. W. Whitaker has been appointed full-time Senior Lecturer in Medicine and Mr. D. H. Randall and Mr. D. J. Robertson part-time Clinical Teachers in Surgery.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

At a meeting of the Council of the College held on January 13, with Sir Harry Platt, President, in the chair, the deaths of Sir Arthur Keith (Past Conservator of the Museum and Master of the Buckston Browne Farm) and Mr. R. J. Willan (Past Member of Council) were reported and the Council unanimously adopted resolutions of condolence.

A Moynihan Lectureship was awarded to Professor H. Olivecrona, of Stockholm.

Diplomas of Fellowship of the Faculty of Anaesthetists were granted to Sheila McC. Wilson and A. H. Kasasian.

Diplomas were granted, jointly with the Royal College of Physicians of London, as follows:

DIPLOMA IN LARYNGOLOGY AND OTOLOGY.—S. E. M. Bates, C. Chowdhary, A. R. N. Dhanji, D. A. T. Farrar, G. F. Fennell, A. N. Griffith, G. M. Homan, B. Jha, M. S. Khan, P. M. Kothary, M. V. Kurian, J. T. Lees, J. A. M. Martin, N. G. McGuire, J. R. Purvis, D. Russell, J. R. Samuel, S. D. Sethi, T. M. Srinivasan, M. M. Wain, W. M. K. Wijetunga.

DIPLOMA IN ANAESTHETICS.—Catherine K. Adam, R. D. Allan, H. B. Aronson, A. C. Ashton, L. M. V. Attygalle, P. S. Barclay, K. W. Baruch, K. Biss, J. A. Blundell, Janet C. Brash, June E. Brett, H. D. Browne, Mavis Buck, Fodla B. K. Burnell, Anthea M. Bushby, P. R. Chalk, Peggy J. Clark-Roberts, Sheila R. Clarke, J. A. Cluver, I. McI. Cochran, A. R. Cohen, Phyllis Connor, C. M. Conway, H. M. C. Corfield, L. G. B. Cumpston, P. N. Cunliffe, Muriel D. Dalby, Margaret C. D. Daniel, W. R. Daniel, E. J. D'Arcy, J. Davenport, J. W. Desmond, J. D. Dickson, Maria T. D'Ocon Asensi, B. A. Dowdell, H. D. Doyle, Winifred B. Drew, Beatrice M. Evans, Rosemary A. Faull, L. Feldman, P. Flintan, B. G. Francis, J. E. S. Gould, Elizabeth Green, J. Greenan, N. R. Gupta, S. J. Halkett, I. M. Hallack, G. G. Harrison, H. I. Heffernan, R. S. T. Hey, J. D. Holdsworth, Thelma B. Hoyle, Elaine V. Hulse, Molly C. Jacklin, J. R. E. Jenkins, E. G. R. Jones, K. Kennedy, A. R. Kerr, A. Kilpatrick, D. W. King, M. Lauchlan, Lucy T. Lee, Heather J. Lopert, Dorothy J. Lucas, G. F. Lynam, I. Macphail, Esmee D. Martin, P. M. Mehta, Catherine H. McK. Mellen, Morag J. R. Millar, W. More, B. D. Morison, Annie Mortell, S. M. MacD. O'Brien-Moran, Helen B. O'Hea, R. H. Oram, Buddug Phillips, A. P. Poole, Freda E. Prince-White, T. C. Probyn, K. R. Rama Rao, Stella J. E. Randall, M. V. Rao, J. T. Russell, Yvonne K. Russell, D. K. Sen, Margaret H. N. Smith, B. Solomon, Jean P. Spalding, H. Stabile, H. W. Stanley, A. Thorogood, J. N. Thorpe, F. Turrettini, C. H. van Hasselt, I. R. Verner, N. A. Vincent, Betty R. Warltier, A. N. E. Watt, R. P. Wise, W. S. Wren, T. M. Young.

DIPLOMA IN OPHTHALMOLOGY.—C. Chowdhary.

DIPLOMA IN MEDICAL RADIOTHERAPY.—J. W. Logan.

DIPLOMA IN CHILD HEALTH.—J. A. Kay.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **April 2** (No. 13) and corresponding week 1954.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1955					1954				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	9	1	3	0		22	1	11	1	1
Dysentery	1,869	120	417	26	3	1,642	266	438	3	5
Encephalitis, acute	4	0		0		6	0			
Enteric fever:										
Typhoid	2	0	0	0		1	0	4	0	1
Paratyphoid	17	4	2	0		11	2	1	1	0
Food-poisoning	186	14		0		178	18		0	
Infective enteritis or diarrhoea under 2 years				14	12				7	26
Measles*	32,324	4103	505	498	125	2,330	45	161	55	498
Meningococcal infection	41	1	13	1	3	39	5	17	2	2
Ophthalmia neonatorum	43	2	8	0		30	5	5	0	
Pneumonia†	1,050	72	338	18	27	529	29	250	12	2
Poliomyelitis, acute:										
Paralytic	5	2	3	0		14	0	2	1	
Non-paralytic	1	1				7	0			
Puerperal fever§	224	41	17	1		245	42	16	0	
Scarlet fever	822	49	97	55	29	1,474	76	153	40	43
Tuberculosis:										
Respiratory	704	75	133	15		777	85	144	34	
Non-respiratory	78	1	25	5		103	7	19	5	
Whooping-cough	1,849	156	115	43	36	2,546	105	400	45	42

DEATHS in Great Towns	1955					1954				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	0	0	0	0	1	0	0	0	0	0
Dysentery	0	0		0		0	0		0	
Encephalitis, acute		0			0			0		0
Enteric fever	1	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years	7	0	2	1	2	11	1	0	2	0
Influenza	59	5	2	1	9	6	1	0	0	0
Measles		0	0	0	1			0	0	1
Meningococcal infection		1	0					0	0	
Pneumonia	398	60	30	19	22	235	28	25	9	7
Poliomyelitis, acute	1	0		0	0	0	0			0
Scarlet fever		0	0	0	0			0	0	0
Tuberculosis:										
Respiratory	89	15	21	2	10	99	10	6	5	8
Non-respiratory		1	1	0	0			2	0	0
Whooping-cough	1	0	1	0	0	2	0	1	0	0
Deaths 0–1 year	239	35	34	3	11	212	17	26	8	30
Deaths (excluding stillbirths)	6,840	1025	703	153	266	5,438	720	721	125	211
LIVE BIRTHS	8,129	1181	1009	236	478	8,231	1227	982	217	448
STILLBIRTHS	189	32	23			218	23	26		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Vital Statistics

Infectious Diseases during First Quarter in England and Wales

After the very poor summer of 1954 the popular belief was that resistance to disease might be lowered and a large amount of sickness result in the winter. The vital statistics of the fourth quarter did not support this theory, and the notifications of infectious diseases during the first quarter of this year also fail to support such a hypothesis.

During the first quarter of 1955 in England and Wales the notifications of scarlet fever and diphtheria reached record low levels. The notifications of diphtheria were only 1/120 of those in the first quarter of 1938. The notifications of acute poliomyelitis were the lowest for any first quarter since the disease appeared in epidemic form in 1947. The incidence of measles was slightly lower than usual in a year of epidemic incidence, but this was due to the fact that the maximum appeared about a month later than usual, and the epidemic will probably reach the same size as those in 1951 and 1953. Deaths from influenza have followed the pattern of recent years of a diminishing peak in the epidemic year. Dysentery provided the only exception to a low or moderate incidence, and the number of notifications from this cause reached a record high level. The numbers of notifications of infectious diseases for the first quarters of the past five years are as follows :

	1951	1952	1953	1954	1955
England and Wales:					
Scarlet fever	12,088	18,013	20,550	15,868	9,121
Whooping-cough ..	66,865	35,042	34,207	28,985	25,020
Measles	311,709	64,596	350,836	23,340	251,486
Acute poliomyelitis ..	339	288	345	332	208
Diphtheria	572	456	264	246	173
Meningococcal infections	662	562	595	515	499
Dysentery	13,995	6,936	4,449	10,808	14,551
Acute pneumonia ..	26,536	12,960	20,005	10,507	13,430
Enteric fever	149	126	123	244	113
Great Towns:					
Influenza deaths ..	7,448	496	2,995	398	1,181

Infectious Diseases

The only variations of note in the trends of the notifications of infectious diseases in England and Wales during the week ending April 2 were increases of 3,642 for measles, from 28,682 to 32,324, 66 for acute pneumonia, from 984 to 1,050, and 54 for dysentery, from 1,815 to 1,869.

With the exception of the 1953 epidemic the number of notifications of measles was the largest since this disease was made notifiable. The largest rises in the incidence of measles during the week were 766 in London, from 3,337 to 4,103, 496 in Warwickshire, from 2,910 to 3,406, 424 in Middlesex, from 1,574 to 1,998, 233 in Buckinghamshire, from 272 to 505, 256 in Derbyshire, from 814 to 1,070, 175 in Southampton county, from 373 to 548, 157 in Durham, from 841 to 998, 152 in Sussex from 277 to 429, 144 in Glamorganshire, from 376 to 520, 142 in Kent, from 1,081 to 1,223, 128 in Worcestershire, from 364 to 492, 111 in Gloucestershire, from 279 to 390, 109 in Staffordshire, from 1,017 to 1,126, and 109 in Wiltshire, from 137 to 246, while the only large fall was 102 in Surrey, from 1,393 to 1,291. 822 cases of scarlet fever, 7 more than in the preceding week, were notified, and the largest rise was 25 in Essex, from 40 to 65. 1,849 cases of whooping-cough, 18 fewer than in the preceding week, were notified, and the largest fluctuations were a rise of 47 in Warwickshire, from 83 to 130, and a fall of 32 in Cheshire, from 73 to 41. 9 cases of diphtheria were notified, being 2 fewer than in the previous week ; 2 cases of diphtheria were notified in Birmingham C.B. and in Manchester C.B. The rise in the number of notifications of paratyphoid fever from 4 to 12 was due to cases scattered throughout 11 counties.

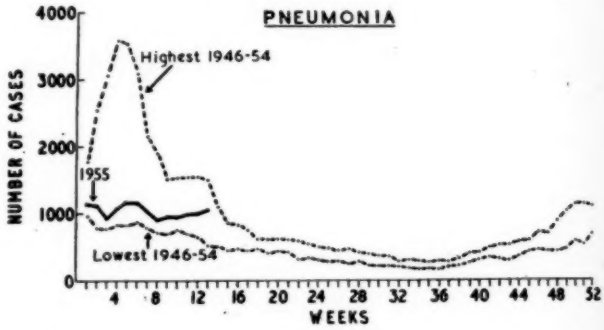
6 cases of acute poliomyelitis were notified. These were 1 fewer for paralytic and 3 fewer for non-paralytic cases than in the preceding week. 3 of the 6 cases were notified in London (Holborn 2).

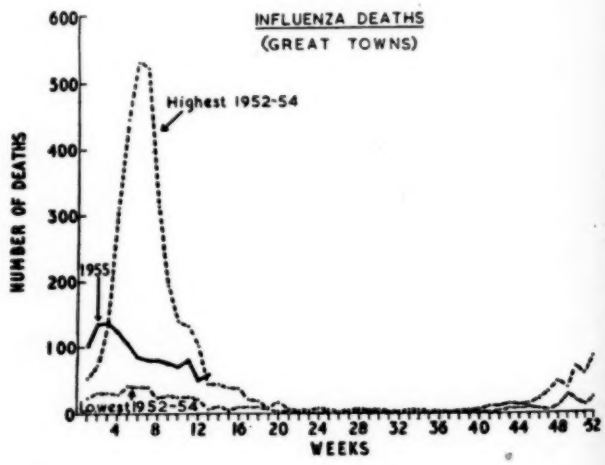
The number of notifications of dysentery was the largest ever recorded. The chief centres of infection were Lancashire 624 (Blackpool C.B. 135, Oldham C.B. 113, Blackburn C.B. 69, Manchester C.B. 63, St. Helens C.B. 40, Chadderton U.D. 33, Middleton M.B. 25, Royton U.D. 22, Liverpool C.B. 19, Lytham St. Anne's M.B. 16, St. Helens C.B. 14, Kirkham U.D. 13, Failsworth U.D. 11), Durham 241 (Seaham U.D. 72, Darlington R.D. 49, Easington R.D. 30, South Shields C.B. 22, Felling U.D. 20, Stanley U.D. 17, Gateshead C.B. 16), Yorkshire West Riding 144 (Huddersfield C.B. 41, Leeds C.B. 35, Castleford U.D. 20, Sheffield C.B. 13), Northumberland 130 (Newcastle-upon-Tyne C.B. 30, Whitley Bay M.B. 27, Bedlingtonshire U.D. 23, Blyth M.B. 20), London 120 (Shoreditch 23, Hackney 20, Islington 20, Southwark 10), Leicestershire 77 (Leicester C.B. 60), Norfolk 66 (Norwich C.B. 39), Yorkshire North Riding 49 (Middlesbrough C.B. 46), Surrey 46 (Carshalton U.D. 16, Woking U.D. 11), Warwickshire 45 (Nuneaton M.B. 27, Birmingham C.B. 12), Cheshire 39 (Stockport C.B. 26), Southampton county 25 (Droxford R.D. 14), Lincolnshire 25 (Scunthorpe M.B. 21), and Nottinghamshire 24.

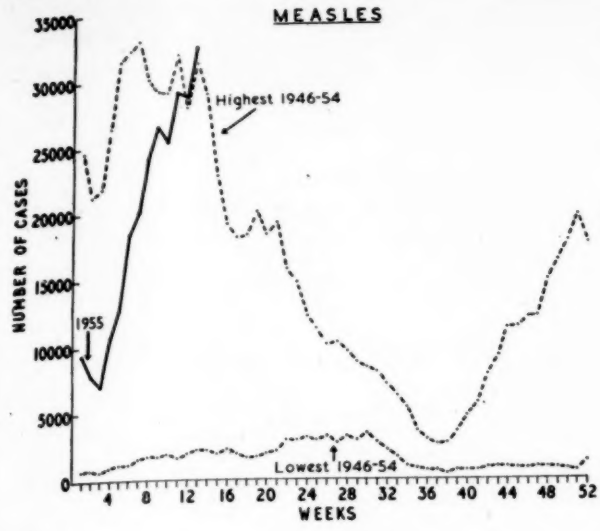
In Scotland an increasing incidence of dysentery has been recorded during recent weeks. 417 cases, an increase of 83 on the preceding week, were notified during the week. The largest returns were Glasgow 176, Dundee 50, Lanark county 47, Edinburgh 33, and Stirling county 32.

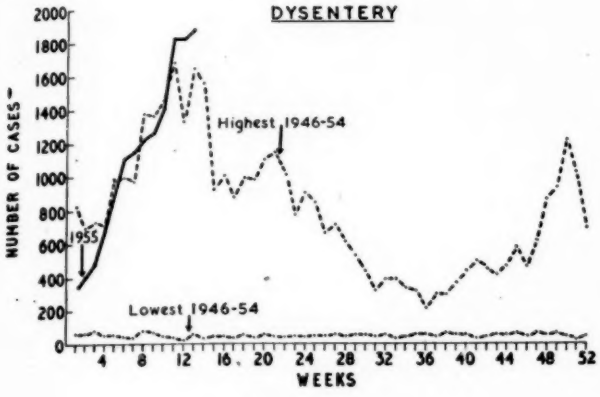
Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases (deaths for influenza) of certain diseases notified weekly in England and Wales (great towns for influenza). Highest and lowest figures reported in each week during the nine years 1946–54 (influenza, 1952–4) are shown thus ------, the figures for 1955 thus ———. Except for the curves showing notifications in 1955, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.









Week Ending April 9

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 665, whooping-cough 1,310, diphtheria 5, measles 26,833, acute pneumonia 872, acute poliomyelitis 7, dysentery 1,454, paratyphoid 13, and typhoid fever 4.

Medical News

Medical Illustration.—In the Old Library at B.M.A. House the Medical Artists' Association of Great Britain has staged a small exhibition of its members' work. There are paintings and drawings of operations and dissections, suitable for the illustration of books or papers; visual records of endoscopic and ophthalmoscopic appearances; models in resins and wax; composite panels illustrating clinical syndromes; slides; and other aids to the medical teacher. The work is of a remarkably high quality. Opening the exhibition on April 15, Sir CECIL WAKELEY, the association's honorary president, said he was keen to see the medical artist become established as an essential member of the staff of every hospital in the country, especially the teaching hospitals. Illustrations before and after operation were invaluable, he said; more so, in some cases, than pages of medical notes. The exhibition will remain open until April 30 from 10 a.m. to 5 p.m. (on Wednesday until 8 p.m.). A list of members of the Medical Artists' Association is available at the exhibition, giving their addresses and appointments. This should prove most useful to medical authors and teachers.

Royal Northern Hospital.—In place of the old North London Medical and Chirurgical Society, it is intended to hold open monthly meetings for postgraduates and general practitioners at the Royal Northern Hospital, Holloway. These meetings will usually be held at 2.30 p.m. on the last Thursday of the month, and their chief aim will be discussion of clinical subjects by both hospital staff and general practitioners. The first meeting will be held at 2.30 p.m. on April 28 (in St. David's Wing) when Dr. J. F. BUCHAN will speak on "The Relief of Pain by Physical Methods" followed by a demonstration and discussion. Local general practitioners are particularly welcome.

Grey Turner Lectures.—Sir ZACHARY COPE will deliver the first annual Grey Turner Lecture at Newcastle-upon-Tyne on May 19. His subject will be "Some Early Medical Museums." The Grey Turner lectures are endowed by a bequest to King's College, University of Durham, by the late Professor George Grey Turner, and in accordance with his wishes their subject will be some aspect of the history of surgery. Before the lecture, at 5 p.m., a memorial plaque to Professor Grey Turner will be unveiled in the Royal Victoria Infirmary.

Hunterian Society's Gold Medal Essays.—The winner of last year's gold medal, for an essay on the "Management of the Climacteric in General Practice," is Dr. PHILIP HOPKINS, of Hampstead. He will receive the medal at the annual meeting of the society at the Talbot Restaurant, London, on April 25. The subject for the 1955 essay is "Headache," and the competition is open to all general practitioners. Further details from Mr. R. S. MURLEY, 95, Harley Street, London, W.1.

Ames Awards in Gastroenterology.—The American College of Gastroenterology and the Ames Company of Elkhart, Indiana, announce prizes of $250, $100, and $50, with a year's free subscription to the *American Journal of Gastroenterology*, for the best papers submitted before September 1 on original work in gastroenterology. The competition is open to any doctor irrespective of nationality. Further details may be obtained from the Americal College of Gastroenterology, 33, West 60th Street, New York, 23.

Honorary Freeman of Barbers' Company.—At a meeting of the Court of the Worshipful Company of Barbers of London at Tallow Chandlers' Hall on April 5, the Master, Sir CECIL WAKELEY, admitted Sir JAMES PATERSON ROSS as an Honorary Freeman.

Dr. Charles Hill, the new Postmaster-General, was sworn a member of the Privy Council on April 12.

Helms Trophy for Dr. Bannister.—On April 12 Dr. ROGER BANNISTER was presented with the Helms Trophy of the Helms Athletic Foundation of America, as being Europe's leading athlete in 1954. The presentation was made in London by Mr. HAROLD ABRAHAMS, honorary treasurer of the British Amateur Athletic Board. It commemorates the first mile under 4 minutes (3 minutes 59.4 seconds at Oxford on May 6, 1954) and the mile of 3 minutes 58.8 seconds in the British Empire Games.

Sir Cecil Wakeley received the honorary D.Sc. of Delhi University last month. He is the first member of the medical profession to have this honour.

Professor Ian Aird will deliver the Edward Starr Judd Memorial lecture at Minnesota University on May 26. He will then conduct short postgraduate courses in surgery at Minneapolis and Vancouver, and engage in a lecture tour of Western Canada and the United States. He expects to leave England on May 23 and return on July 7.

Dr. Wilfrid Sheldon, physician-paediatrician to the Queen, is on a lecture tour in Cyprus and Turkey arranged by the British Council. The tour ends on May 6.

COMING EVENTS

The Montreal Conference.—"Medical Aspects of Traffic Accidents," May 4 and 5. Invitations and details from Dr. HAROLD ELLIOTT, Queen Mary Veterans Hospital, 4565, Queen Mary Road, Montreal.

International Hospital Federation.—The Ninth International Hospital Congress will be held at Lucerne from May 29 to June 3. The central theme will be "The Mental Well-being of Patients in the General Hospital." Details from the Federation, 10, Old Jewry, London, E.C.2.

Canadian Neurological Society.—The seventh annual meeting will be held in Toronto, June 16–19. Visiting physicians and scientists are welcome at scientific sessions. Details from office of the secretary, 730, Medical Arts Building, Toronto.

NEW ISSUES

Annals of the Rheumatic Diseases.—The new issue (Vol. 14, No. 1) is now available. The contents include:

HEBERDEN ORATION. Robert M. Stecher.
CARDIAC CHANGES IN RHEUMATOID ARTHRITIS. Nils Egelius, Olle Göhle, Eric Jonsson, and Fredrik Wahlgren.
HUMAN SKIN COLLAGEN FROM DIFFERENT AGE GROUPS BEFORE AND AFTER COLLAGENASE DIGESTION. Madeline E. Keech.
RHEUMATOID ARTHRITIS: DYE RETENTION STUDIES AND COMPARISON OF DYE AND RADIOACTIVELY LABELLED RED CELL METHODS FOR MEASUREMENT OF BLOOD VOLUME. Allan St. John Dixon, Savitri Ramcharan, and Marion W. Ropes.
NATURE OF ANAEMIA IN RHEUMATOID ARTHRITIS. I. METABOLISM OF IRON. L. M. H. Roy, W. R. M. Alexander, and J. J. R. Duthie.
ACTION OF HYPOPHYSEAL GROWTH AND THYROTROPHIC HORMONES IN THYROIDECTOMIZED RATS. E. Salgado.
ANKYLOSING SPONDYLITIS. F. Dudley Hart. With an Appendix by N. F. Maclagan.
THERAPY OF "FELTY'S SYNDROME." Philip Ellman, Leon Cudkowicz, and J. Stanley Elwood.
A SIMPLE POSTURE METER. R. Harris.

Issued quarterly; annual subscription £2 2s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

British Heart Journal.—The next issue (Vol. 12, No. 2) is now available. The contents include:

PATENT DUCTUS ARTERIOSUS WITH PULMONARY HYPERTENSION. William Whitaker, Donald Heath, and James W. Brown.
CALIBRATION OF AN ELECTRONIC PHONOCARDIOGRAPH. By A. W. Sloan and J. R. Greer.
THE EARLY DIASTOLIC SOUND OF CONSTRICTIVE PERICARDITIS. Patrick Mounsey.
THE RESTING HYPERVENTILATION OF CONGENITAL HEART DISEASE. R. J. Shephard.
THE BLOOD FLOW IN THE RIGHT ATRIUM AND SUPERIOR VENA CAVA IN TRICUSPID INCOMPETENCE. Ottar Müller and John Shillingford.
A PHOTOMETRIC METHOD FOR ESTIMATING THE OXYGEN SATURATION OF SMALL BLOOD SAMPLES. L. Molyneux and E. A. Pask.
SOME VARIATIONS IN THE SHAPE OF THE PRESSURE CURVE IN THE HUMAN RIGHT VENTRICLE. Peter Harris.
SECONDARY TUMOURS OF THE HEART AND PERICARDIUM. Robert B. Goudie.
THE ELECTROCARDIOGRAM IN PRIMARY ENDOCARDIAL FIBROELASTOSIS. Peter Vlad, Richard D. Rowe, and John D. Keith.
AORTIC VALVULAR STENOSIS WITH COARCTATION OF THE AORTA. D. E. Smith and M. B. Matthews.
THROMBOSIS OF THE MAIN PULMONARY ARTERIES. Oscar Magidson and George Jacobson.
THE INTRACARDIAC ELECTROGRAM AS AN AID IN CARDIAC CATHETERIZATON. D. Emslie-Smith.
THE ATRIAL PRESSURE TRACING IN CONGENITAL HEART DISEASE. R. J. Shephard.
THE RESULTS OF VALVOTOMY FOR SIMPLE PULMONARY STENOSIS. Maurice Campbell and Sir Russell Brock.
UPPER ATRIO-VENTRICULAR NODAL BEATS PRECIPITATED BY VENTRICULAR EXTRASYSTOLES WITH RETROGRADE CONDUCTION. A. Schott.
PATENT DUCTUS ARTERIOSUS WITH AN ABNORMAL AORTIC VALVE. R. E. Bonham-Carter, C. H. M. Walker, R. Daley, M. B. Matthews, and W. E. Medd.

Issued quarterly; annual subscription £2 2s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Saturday, April 23

KENT PAEDIATRIC AND CHILD HEALTH SOCIETY.—At Queen's Head Hotel, Maidstone, 3 p.m., eighth annual general meeting.

Monday, April 25

●HUNTERIAN SOCIETY.—At Talbot Restaurant, 64, London Wall, E.C., 7 for 7.30 p.m., annual general (dinner) meeting. Professor E. N. da C. Andrade, F.R.S.: Isotopes.
MEDICAL SOCIETY OF LONDON.—8.30 p.m., Second Lettsomian Lecture by Dr. J. G. Scadding: Treatment of Pulmonary Tuberculosis.
NATIONAL SPASTICS SOCIETY.—At Old Council Hall, Bromley Road, Beckenham, 8 p.m., Dr. and Mrs. K. Bobath: Working Methods of Treatment in the Field of Cerebral Palsy.

Tuesday, April 26

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—3.45 p.m., Arnott Demonstration by Professor R. J. Last: Form and Structure of Muscles.
ROYAL STATISTICAL SOCIETY: STUDY CIRCLE ON MEDICAL STATISTICS.—At Westminster Medical School, 6 p.m., Dr. J. N. Morris: Some Hypotheses on Coronary Artery Disease.
WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY.—5.30 p.m., neurological demonstration by Dr. B. G. Parsons-Smith.

Wednesday, April 27

BIRMINGHAM MEDICAL INSTITUTE: SECTION OF PSYCHIATRY.—At Queen Elizabeth Hospital, Birmingham, 8 p.m., clinical meeting.
LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION.—At Royal Free Hospital School of Medicine, 8.30 p.m., short papers and discussion: Some Obstetric Problems in General Practice. Short papers by Dr. Dorothy M. Parkin: The Rh Factor; Dr. Helen Payling Wright: Thrombosis; Miss Josephine Barnes: Toxaemia.
MEDICAL SOCIETY OF LONDON.—8.30 p.m., Third Lettsomian Lecture by Dr. J. G. Scadding: Treatment of Pulmonary Tuberculosis.
OSLER CLUB OF LONDON.—At 1, Wimpole Street, W., 8.15 p.m., meeting in honour of Anthelme Brillat-Savarin (born April 1, 1755). J. I. M. Jones, D.Sc.: Savour, Science, and Brillat-Savarin. Discussion, Professor S. J. Cowell and Mr. L. R. Ring.
ROYAL SOCIETY OF ARTS.—2.30 p.m., Peter Le Neve Foster Lecture by Sir Basil Henriques, J.P.: Detection and Prevention of Anti-social Behaviour in Young Persons.
ST. MARYLEBONE HOSPITAL FOR PSYCHIATRY AND CHILD GUIDANCE.—5.30 p.m., Dr. A. F. McGlashan: Principles in Psychotherapy.
SOCIETY OF CHEMICAL INDUSTRY: FOOD GROUP.—At the Town Hall, Bournemouth, 10 a.m., joint meeting with Royal Sanitary Institute. Subject: Contribution of Processing Techniques to the Nutritional Value of Food. Professor J. Yudkin: Normal Processing Techniques; Dr. A. J. Amos, Ph.D.: Fortification.

Thursday, April 28

HONYMAN GILLESPIE LECTURE.—At University New Buildings, Edinburgh, 5 p.m., Professor G. J. Romanes: Motor Cells of the Spinal Cord.
LONDON JEWISH HOSPITAL MEDICAL SOCIETY.—At Medical Society of London, 8.30 p.m., Dr. I. R. Marre: Common Skin Diseases.
LONDON UNIVERSITY.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., special university lecture in pathology by Professor R. J. Dubos (Rockefeller Institute for Medical Research): Micro-environment of Inflammation or Metchnikoff Revisited.
NUFFIELD ORTHOPAEDIC CENTRE.—At Wingfield-Morris Orthopaedic Hospital, 8.30 p.m., Mr. R. G. Taylor: Brown-Séquard Syndrome following Trauma.
ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5 p.m., Hunterian Lecture by Professor W. T. Cooke: Nutritional and Metabolic Factors in the Aetiology and Treatment of Regional Ileitis.
ROYAL SOCIETY.—4.30 p.m., Bakerian Lecture by Professor M. L. E. Oliphant, F.R.S. (Australia): Acceleration of Charged Particles to Very High Energies.
ST. ANDREWS UNIVERSITY.—At Physiology Department, Medical School, Small's Wynd, Dundee, 5 p.m., Dr. W. Feldberg: A New Experimental Approach to the Pharmacology of the Central Nervous System.
SURREY INTER-HOSPITAL PSYCHIATRIC ASSOCIATION.—At Netherne Hospital, Coulsdon, Surrey, 8 p.m., clinical meeting. Papers by Dr. I. C. White, Dr. J. P. S. Robertson, and Dr. R. K. Freudenberg.

Friday, April 29

CAMBRIDGE MEDICAL SOCIETY.—At Addenbrooke's Hospital, 3 p.m., Dr. J. D. Spillane: Neurology in General Practice.
INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., clinical demonstration by Dr. J. G. Scadding.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY.—3.30 p.m., Mr. J. C. Ballantyne: Use of Hearing-aids.
MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.—At 11, Chandos Street, W., 7.30 p.m., short papers by Surgeon Lieutenant P. R. Oliver, R.N., Dr. G. W. Czonka, and Dr. R. S. Morton.
ST. MARY'S HOSPITAL MEDICAL SCHOOL.—At Wright-Fleming Theatre, 5 p.m., Mr. I. M. Jackson: Ectopic Gestation.
UNIVERSITY COLLEGE LONDON: DEPARTMENT OF PHARMACOLOGY.—At Physiology Theatre, Gower Street, W.C., 5.15 p.m., Cushny Memorial Lecture by Dr. S. E. Dicker: Renal Clearances in Mammalian Kidneys.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Carter.—On April 7, 1955, to June, wife of Dr. J. K. Carter, Redhill County Hospital, Surrey, a daughter—Heather.
Clarke.—On April 14, 1955, at Gosforth, Newcastle-upon-Tyne, to Catherine, wife of Mr. Patrick Clarke, F.R.C.S., a son.
MacLeod.—On April 14, 1955, at Nuffield House, Guy's Hospital, London, S.E., to Joan, wife of Dr. Ian S. MacLeod, a son—Hamish.
Turner Warwick.—On March 25, 1955, to Margaret (formerly Harvey Moore), M.R.C.P., wife of Richard Trevor Turner Warwick, F.R.C.S., M.R.C.P., a sister for Gillian—Lynne Frances.
Vowles.—On April 9, 1955, at Cardiff, to Mary, wife of Mr. Keith Vowles, M.B., F.R.C.S., a daughter—Susan Jane.
Wilkinson.—On April 12, 1955, at St. Mary's Hospital, Paddington, London, W., to Patricia (formerly Piper), wife of Dr. A. P. H. Wilkinson, a brother for Timothy and Robin—Nicholas Simon John.

MARRIAGES

Davis—Liddle.—On April 2, 1955, at Beverley Minster, Yorks, Leslie Russell Davis, M.D., of the Royal Free Hospital, London, W.C., to Margaret Jean Liddle, S.R.N., of Cottingham, Yorkshire.
Trigg—Jordan.—On April 16, 1955, at St. Barnabas' Church, Dulwich Village, London, S.E., Kenneth H. Trigg, M.B., B.S., of Surbiton, Surrey, to Sylvia Jordan, M.B., B.S., of Herne Hill, London, S.E.

DEATHS

Barbour.—On April 12, 1955, at 97, Alleyn Park, Dulwich, London, S.E., Thomas Barbour, M.B., Ch.B., D.P.H., aged 75.
Mitchell.—On April 9, 1955, at The Mount, Topcliffe, near Thirsk, Yorks, Talbot Carter Mitchell, M.R.C.S., L.R.C.P., aged 78.
Roche.—On April 7, 1955, Alfred Reginald Roche, *M.C.*, M.R.C.S., L.R.C.P., of 13, North Park Avenue, Leeds, Yorks, aged 79.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Prognosis after One Epileptic Child

Q.—*A young couple have an epileptic child aged 2½ years. Contraceptive measures have failed, and the wife is now pregnant. They are fearful that a second child will also be epileptic. The wife's mother had fits as a child and after the menopause. Can one reassure them that the chances of a second child being epileptic are very faint, and that another pregnancy is really desirable?*

A.—In this case there is a chance of approximately one in twenty that the second child will in due course develop epilepsy like the elder sib, as it is to be assumed that the epilepsy in the cases of the elder child and the grandmother was "idiopathic" or cryptogenic. However, if the epileptic child only developed the trouble after possible or probable damage to the brain—for example, birth injury or a febrile illness—then there would be no increased tendency for the second sib to be epileptic too, and the probability which obtains for the general population—that is, approximately 1 in 200—would hold.

Clearly, the parents can be emphatically reassured, as at the worst there is only a small chance that the second child will not be normal.

Hereditary Factors in Endogenous Depression

Q.—*To what extent is endogenous depression hereditary? A patient of mine wishes to marry a man whose mother suffers from attacks of endogenous depression about twice a year, when she gets so agitated that she has to retire to a mental home for several weeks. It is not known whether other members of the family have suffered from mental disorders. The son appears quite normal.*

A.—The hereditary factor in the predisposition to endogenous depression is quite strong. If any single gene can be held responsible, it would probably be an irregular dominant. If a parent is liable to recurrent manic or depressive states of such severity as to require hospital treatment, then one in five (approximately) of the children can be expected to show signs of a similar disposition. However, more often than not the mood swings in the child will never be so severe as to need treatment in hospital.

In the case quoted a great deal depends on the present age of the son. If he is still in his early twenties, then his present normality does not preclude the possibility that he will develop a cyclothymic temperament, and still less the possibility that he may one day have an endogenous depression. Even then, however, the chances are rather remote that he will develop the very disabling pattern of recurrence shown by the mother. If the son is well into the thirties, and shows no sign of a tendency to spontaneous mood swings, it is exceedingly improbable that he will have anything worse than one or two isolated depressive illnesses late on in life; and the chances are about 9 to 1 that he will go through the rest of his life without trouble.

Persons with a tendency to endogenous mood swings very rarely indeed become chronic psychiatric invalids. If they have an illness, they nearly always get over it satisfactorily, and rarely have difficulty in maintaining their social level. Numbers of them are socially more than averagely successful, and as a class they tend to be rather easy to get on with.

The inquirer's patient should feel no very great apprehension in deciding to marry the man described, unless he also shows defects of character or personality of other kinds.

Provocative Androgen in the Acid Phosphatase Test

Q.—*Can you give me any details about a test for determining the acid phosphatase level in cases with a doubtful positive result by the ordinary methods? I believe this test is concerned with giving a provocative dose of testosterone to activate the output of acid phosphatase by the prostate in cases of carcinoma.*

A.—Under physiological conditions, no acid phosphatase can be detected in the plasma, but in the presence of a carcinoma of the prostate, and especially when there is metastasis to bone, this enzyme passes into the blood stream, and its detection has proved a valuable diagnostic aid. The administration of androgen in these cases increases the plasma acid phosphatase level, and so could be used as a provocative test where doubt exists; the administration of oestrogens diminishes the plasma level.

Toxic Hazards of Aniline and Benzene Compounds

Q.—*What routine supervision should be given to workers dealing with aniline and benzene compounds with a view to the prevention and early detection of toxic effects?*

A.—Under the Chemical Works Regulations (1922) all persons engaged in any "nitro" or "amido" process (which includes the nitro- and amide (amino) compounds of benzene) shall be examined by a doctor once a month (or at other such intervals as may be prescribed) (Reg. 30(c)), and the results entered in a health register. Other provisions of these regulations are that no person under 18 years of age should be employed in such a process (Reg. 24); that protective clothing, such as overalls and protective footwear, shall be provided—the overalls to be washed or renewed at least once a week (Reg. 25). A cloakroom has also to be provided for the working and other clothes, as well as storage space for the protective clothing (Reg. 26). So that meals shall not be taken in the workroom a mess room must be provided for the workers (Reg. 27), and not only must good washing facilities be provided (Reg. 28) but also bathing accommodation, with hot and cold water, with soap and towels (Reg. 29). A bath register must be kept containing a list of all people employed in contact with the chemicals, and the date on which each person takes a bath must be entered. By regulation all persons employed in the processes must carefully wash the hands and face before taking food or leaving the factory.

These regulations recognized that aniline (aminobenzene) and most of the nitro-compounds of benzene (e.g., nitrobenzene) are absorbed by the unbroken skin, as well as the fact that most of them are volatile and the vapours can be inhaled. In general, therefore, preventive measures should consist in keeping the chemicals off the skin, and, if splashes on the skin do occur, their rapid removal by washing in *cold* water. Exhaust ventilation should be applied to the processes to keep the vapours out of the air of the workroom.

The compounds of benzene are numerous, but aniline and nitrobenzene can be taken as good examples. Both are tissue asphyxiants and narcotics, and the common early presenting sign of poisoning is cyanosis of the skin, due to the formation of methaemoglobinaemia. This sign may be detected by an experienced foreman, who should be instructed to send a cyanosed worker immediately to the doctor. Further information about the signs and symptoms of poisoning can be obtained from the standard textbooks on industrial toxicology. Aniline poisoning is notifiable under the Factories Act.

Stramonium Leaves and Smoker's Cough

Q.—*Would the addition of stramonium leaves to tobacco benefit smoker's cough?*

A.—The addition of stramonium leaves to tobacco would certainly not benefit smoker's cough. Stramonium leaves contain both hyoscyamine and hyoscine, and these substances

greatly diminish or arrest ciliary movement. This movement normally removes the tarry deposits from tobacco smoke which are formed in the bronchioles. The tar is transported from the respiratory passages into the oesophagus. The cough probably arises from the irritation caused by the tarry deposits, and would be made worse if the removal of these deposits were impeded.

Circumcision and Sexual Satisfaction

Q.—*I have heard it said on various occasions, sometimes by men and sometimes by women, that women prefer coitus with a circumcised male because he takes longer to reach orgasm than one who is uncircumcised. Is this a statement of fact or merely an expression of opinion?*

A.—This is a belief rather than a fact, but it is one which has been firmly held by certain races from earliest times. Ancient as well as modern literature contains accounts of women who, after failing to satisfy their sexual desires elsewhere, turned ultimately to a man who had been circumcised. The idea is widely accepted and discussed amongst the more primitive peoples to-day.

It is said that removal of the prepuce results in the glans penis becoming less sensitive to touch, and more stimulus is therefore required to produce an emission. The coital act is thus prolonged, and this tends to ensure that the woman always reaches orgasm. The same objective can be achieved by other means, so that the reputation enjoyed by circumcision is traditional rather than proved, and it remains to be shown that any success which a circumcised lover may have is "based not on artistry but on anatomy" (R. L. Dickinson). It may be added that ejaculation is not dependent only on the tactile sensitivity of the glans, and it is not uncommon to hear circumcised men complaining of premature ejaculation.

Circumcision does not necessarily make the act more pleasurable for the male, but the men of Eastern races tend in any case to set great store on mere prolongation of coitus—with or without the interests of the female partner in mind. Some authorities hold that this is the original motive for ritual circumcision as practised by certain primitive communities.

Plastic Ring Pessaries

Q.—*What advantages have plastic ring pessaries over vulcanite and rubber ones?*

A.—Although they can be moulded by heat, the only plastic rings of which the writer has knowledge are rigid in use and therefore a little more difficult to insert than pliable rubber or rubber-covered pessaries. Their great advantage is that they do not irritate the vaginal wall, so the patient remains free from offensive odour and discharge. They therefore require changing only at relatively infrequent intervals, and douching is usually unnecessary. They are not, of course, free from the risk of producing pressure necrosis. Vulcanite pessaries are also much less irritating than rubber-covered ones, although they may not be quite so good in this respect as those made of plastic material.

All ring pessaries, irrespective of their material, are only efficient if the perineum is strong enough to hold them. As a rule, they support the uterus better than the vaginal walls.

Nylon Toothbrushes

Q.—*Are toothbrushes made from nylon or other synthetic fibres better than those made of bristle? What are their advantages and disadvantages?*

A.—Toothbrushes made from nylon or synthetic fibres usually have a longer life than those made of natural bristle. The pattern of wear is also different, as nylon fibres tend to bend, producing a splayed brush (particularly if used with hot water), whereas natural bristle tends to break.

The main disadvantage of nylon toothbrushes is that most are too hard and are liable to damage the gums and teeth. Natural bristle brushes may be hard at first, but soften rapidly with use. As an alternative soft nylon brushes are now available and would appear to clean the teeth and gums adequately without causing damage. However, there is some evidence[1] that brushes made from natural bristles are more efficient cleansers. Unfortunately the supply of first-quality bristle available in this country is at present limited, as this grows on the backs of Siberian hogs.

REFERENCE

[1] *J. Periodont.*, 1954, **25**, 183.

NOTES AND COMMENTS

Wet Clothes.—Colonel L. W. HARRISON (London, S.W.1) writes: Your expert's answer on this subject ("Any Questions?", April 9, p. 923) reminds me of an experience during the South African War of 1899–2 which may help to supplement his remarks usefully. For many months during that war I trekked with an infantry battalion, and on very many days we marched through a steady drizzle in which the soldiers' clothes were wet through. To my surprise at first, the soldiers kept their greatcoats rolled—in those days they carried them "banderole"—that is, rolled and supported on one shoulder whilst hanging diagonally across the body—and they did not put them on until the rain had ceased, in the evening. How they had learnt the tip I did not know. Perhaps it was from some Scot who had condescended to soldier with this "Manchester" battalion; perhaps it had been handed down in the regiment from experience in earlier campaigns. Your expert says, "The more clothing worn, within limits, the warmer the skin." The words "within limits" should be emphasized. For the three years I was in South Africa, during the war and immediately thereafter, except for three days in Lydenburg and two days in Johannesburg, I slept under tent or bivouac, mostly the latter, and in the cold season it was at first a problem to keep warm: it was quite usual then to find the water in one's hand-basin frozen pretty hard. At first I piled on clothing and seemed to become colder and colder, so one night I took off my greatcoat and laid it loosely over me, having concluded that the tightness of the clothing was responsible for the feeling of chilliness. The experiment was a success, and I learnt thereby that for warmth the clothing should not be too tight. In spite of the many days spent in saturated clothing nobody in my medical charge caught cold, so far as I knew.

A Commonwealth Tour.—Mr. D. D. BROWNE (Wangaratta, Victoria, Australia) writes: Mr. A. Lawrence Abel (*Journal*, December 25, 1954, p. 1540) refers to Wangaratta as a town of 16,000 people that has doubled in five years. Actually, the population is a little over 10,000 and has increased 64% in the last seven years. He refers to Dr. Phillips as the local senior surgeon with two partners, and as a member of the Commonwealth B.M.A. Council. None of these statements is correct. . . . In Dr. Phillip's own interest and in justice to his fellow practitioners in this town and surrounding country, among whom your *Journal* circulates, it seems fair to ask that these errors be corrected.

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Correction.—In Dr. A. T. Mennie's letter on tetracycline (*Journal*, April 16, p. 973) the statement in the last paragraph that "terramycin produces fewer side-effects . . ." should have read that "tetracycline produces fewer side-effects."

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